Maintenance and Service Guide

HP Compaq nc4200 Notebook PC

March 2005

This guide is a troubleshooting reference used for maintaining and servicing the notebook. It provides comprehensive information on identifying notebook features, components, and spare parts; troubleshooting notebook problems; and performing notebook disassembly procedures.

Contents

1

Product Description

The HP Compaq nc4200 Notebook PC offers advanced modularity, Intel® Pentium® M and Celeron® M processors, and extensive multimedia support.

HP Compaq nc4200 Notebook PC

1.1 **Features**

- Intel Pentium M 2.13-, 2.00-, 1.86-, 1.73-, or 1.60-GHz processors, or Intel Celeron M 1.50-GHz processor, varying by notebook model

- 12.1-inch, XGA, TFT (1024 × 768) display with over 16.8 million colors

- 80-, 60-, or 40-GB high-capacity hard drive, varying by notebook model

- 256-MB DDR2 synchronous DRAM (SDRAM) at 400 MHz and 533MHz, expandable to 2.0 GB

- Microsoft® Windows® XP Home Edition or Windows XP Professional, varying by notebook model

- Full-size Windows keyboard with embedded numeric keypad

- TouchPad and pointing stick pointing devices, including a dedicated vertical scroll region

- Integrated 10Base-T/100Base-T/1000Base-T Ethernet local area network (LAN) network interface card (NIC) with RJ-45 jack

- Integrated high-speed 56K modem with RJ-11 jack

- Integrated wireless support for Mini PCI IEEE 802.11b/g and 802.11a/b/g WLAN device

- Support for one Type I or Type II PC Card slot, with support for both 32-bit (CardBus) and 16-bit PC Cards

- External 65-watt AC adapter with 3-wire power cord
- 6-cell Li-Ion battery pack, varying by notebook model
- Audio speaker
- Volume up, volume mute, and volume down buttons
- Connectors:
  - Infrared
  - Audio-out (headphone)
  - Audio-in (microphone)
  - Universal Serial Bus (USB) v. 2.0 (3 ports, 1 powered)
  - Power
  - External monitor
  - RJ-45 (network)
  - RJ-11 (modem)
  - S-Video-out
  - PC Card
  - SD Card
  - Primary battery
  - Travel battery
  - Docking connector

1.2 **Resetting the Notebook**

If the notebook you are servicing has an unknown password, follow these steps to clear the password. These steps also clear CMOS:

1. Prepare the notebook for disassembly (refer to Section 4.3, "Miscellaneous Plastics/ Hardware Kit," for more information).

2. Remove the real-time clock (RTC) battery (refer to Section 6.24, "RTC Battery," for more information on removing and replacing the RTC battery).

3. Wait approximately 5 minutes.

4. Replace the RTC battery and reassemble the notebook.

5. Connect AC power to the notebook. Do not reinsert any battery packs at this time.

6. Turn on the notebook.

All passwords and all CMOS settings have been cleared.

1.3 **Power Management**

The notebook comes with power management features that extend battery operating time and conserve power. The notebook supports the following power management features:

■ Standby

■ Hibernation

■ Setting customization by the user

■ Hotkeys for setting the level of performance

■ Battery calibration

■ Lid switch standby/resume

■ Power/standby button

■ Advanced Configuration and Power Management (ACPM) compliance

1.4 **External Components**

The external components on the front of the notebook are shown below and described in Table 1-1.
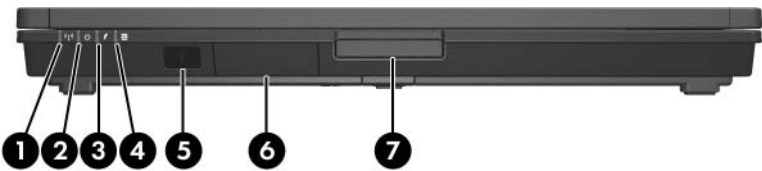
Front Components

Table 1-1

Front Components

Item	Component	Function
1	Wireless light	On: One or more optional internal wireless devices, such as a WLAN device and/or Bluetooth® device, are turned on.
2	Power/standby light	■ Green: The notebook is on. ■ Blinking green: The notebook is in standby mode.

Table 1-1

Front Components *(Continued)*

Item	Component	Function
3	Battery light	■ Amber: A battery pack is charging.
		■ Green: A battery pack is close to full charge capacity.
		■ Blinking amber: A battery pack that is the only available power source has reached a low-battery condition. When the battery reaches a critical low-battery condition, the battery light begins blinking more quickly.
		■ Off: If the notebook is connected to an external power source, the light is turned off when all batteries in the notebook are fully charged. If the notebook is not connected to an external power source, the light is turned off until the battery reaches a low-battery condition, when the light begins blinking amber.
4	Integrated Drive Electronics (IDE) drive light	On: A drive in the hard drive bay is being accessed.
5	Fast IrDA (select models only)	Links the notebook to an optional remote control.
6	Bluetooth module	Sends and receives Bluetooth device signals.
7	Display release button	Opens the notebook.

The external components on the right side of the notebook are
shown below and described in Table 1-2.
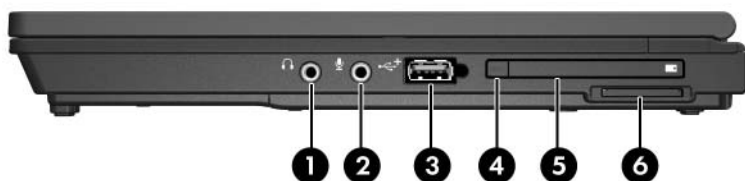
Right-Side Components

Table 1-2

Right-Side Components

Item	Component	Function
1	Audio-out (headphone) jack	Connects an optional headphone or powered stereo speakers. Also connects the audio function of an audio/video device, such as a television or VCR.
2	Audio-in (microphone) jack	Connects an optional monaural (single sound channel) or stereo (dual sound channel) microphone.
3	Powered USB port	Connects USB 1.1- or 2.0-compliant devices to the notebook using a standard USB cable, or connects an optional external MultiBay or external MultiBay II to the notebook. This USB port is a powered port that can be used without external power.
4	PC Card slot eject button	Ejects PC Cards from the PC Card slot.
5	PC Card slot	Supports optional Type I, Type II, 32-bit (CardBus), or 16-bit PC Cards.
6	SD Card slot	Accepts SD (Secure Digital) Memory Cards or MultiMediaCards.

The external components on the left side of the notebook are shown below and described in Table 1-3.
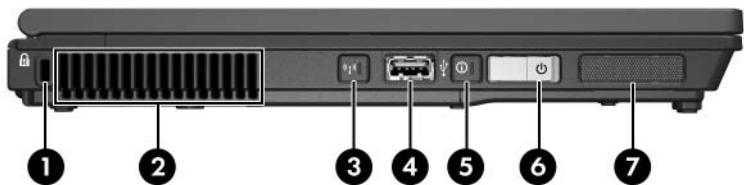
Left-Side Components

Table 1-3

Left-Side Components

Item	Component	Function
1	Security cable slot	Attaches an optional security cable to the notebook.
		✎ The purpose of security solutions is to act as deterrents. These deterrents may not prevent a product from being mishandled or stolen.
2	Vent	Enables airflow to cool internal components.
		△ To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing, may block airflow.

Table 1-3

Left-Side Components *(Continued)*

Item	Component	Function
3	Wireless button (select models only)	Turns the wireless functionality of the WLAN or Bluetooth device on or off, but does not establish a connection. ✎ To establish a wireless connection, a wireless network must already be set up.
4	USB port	Connects a USB 1.1- and 2.0-compliant device to the notebook using a standard USB cable.
5	Info Center button	Enables you to view a list of commonly used software solutions.
6	Power switch	When the notebook is ■ Off, slide toward the front of the notebook and release to turn on the notebook. ■ In standby, slide toward the front of the notebook and release to exit standby. ■ In hibernation, slide toward the front of the notebook and release to exit hibernation. If the notebook has stopped responding and Microsoft Windows shutdown procedures cannot be used, slide toward the front of the notebook and hold for 4 seconds to turn off the notebook.
7	Speaker	Enables you to listen to music and hear audio alerts and signals from programs.

The external components on the rear panel of the notebook are shown below and described in Table 1-4.

Rear Panel Components

Table 1-4

Rear Panel Components

Item	Component	Function
1	USB port	Connects USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable.
2	RJ-11 (modem) jack	Connects a modem cable. Enabled with 56K connectivity.
3	RJ-45 (network) jack	Connects a network cable. Enabled with 10/100/1000BaseT connectivity.
4	Power connector	Connects an AC adapter, an optional AC adapter, or an optional power cable.
5	External monitor port	Connects an optional VGA external monitor or projector.
6	S-Video-out jack	Is a 7-pin, dual-purpose jack. It connects an optional S-Video device, such as a television, VCR, camcorder, overhead projector, or video capture card, with an optional, standard (4-pin) S-Video cable. The extra 3 pins also enable an optional S-Video-to-composite adapter to be used with the notebook.

The standard keyboard components of the notebook are shown below and described in Table 1-5.
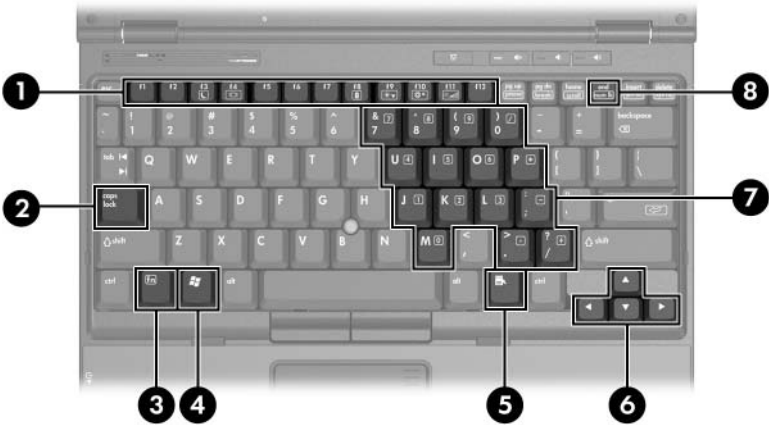
Standard Keyboard Components

Table 1-5

Standard Keyboard Components

Item	Component	Function
1	Function keys (12)	Perform system and application tasks. When combined with the **fn** key, the function keys **f3**, **f4**, and **f8** through **f11** perform additional tasks as hotkeys.
2	**caps lock** key	Enables caps lock and turns on the caps lock light.
3	**fn** key	Executes frequently used system functions when pressed in combination with a function key or the **esc** key.
4	Windows logo key	Displays the Microsoft Windows Start menu.
5	Windows applications key	Displays a shortcut menu for items beneath the pointer.
6	Arrow keys	Moves the cursor around the screen.
7	Embedded numeric keypad	Can be used like an external numeric keypad.
8	**num lock** key	Enables numeric lock, turns on the embedded numeric keypad, and turns on the num lock light.

The notebook top components are shown below and described in Table 1-6.

Top Components

Table 1-6

Top Components

Item	Component	Function
1	Left and right TouchPad buttons (2)	Function like the left and right buttons on an external mouse.
2	TouchPad	Moves the pointer. Can be set to perform other mouse functions, such as scrolling, selecting, and double-clicking.
3	Left and right pointing stick buttons (2)	Function like the left and right buttons on an external mouse.
4	Pointing stick	Moves the pointer.
5	Vent	Enables airflow to cool internal components. △ To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing, may block airflow.
6	Presentation Mode button	Turns on Presentation mode.
7	Volume mute button	Mutes or restores volume.
8	Volume down button	Decreases notebook sound.
9	Volume up button	Increases notebook sound.
10	TouchPad scroll zone	Scrolls upward or downward.

The external components on the bottom of the notebook are shown below and described in Table 1-7.
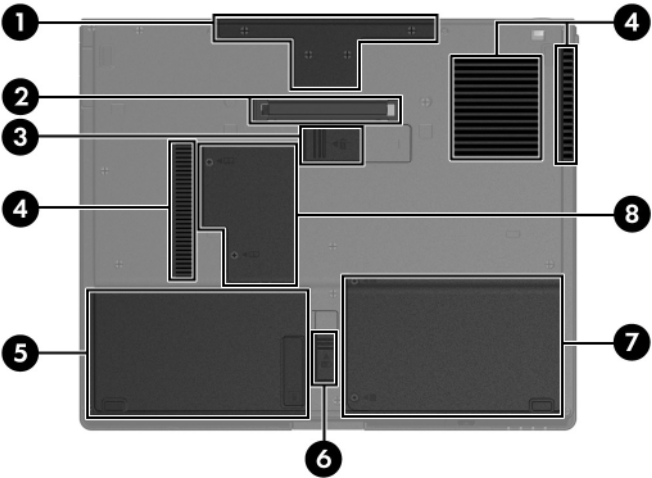
Bottom Components

Table 1-7

Bottom Components

Item	Component	Function
1	Base enclosure cover	Covers the display cable and connector.
2	Docking connector	Connects the notebook to an optional docking device.
3	Travel battery connector	Connects an optional travel battery.
4	Vents (3)	Enable airflow to cool internal components. △ To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing, may block airflow.
5	Primary battery bay	Holds the primary battery pack.
6	Primary battery release latch	Releases the primary battery pack from the battery bay.
7	Hard drive cover	Holds the primary hard drive.
8	Expansion memory module compartment	Contains one expansion memory module slot.

1.5 **Design Overview**

This section presents a design overview of key parts and features of the notebook. Refer to Chapter 4, "Illustrated Parts Catalog," to identify replacement parts, and Chapter 6, "Removal and Replacement Procedures," for disassembly steps.

The system board provides the following device connections:

■ Audio

■ Display

■ Hard drive

■ Intel Pentium M and Celeron M processors

■ Keyboard

■ Memory module

■ Mini PCI communications devices

■ PC Card

■ Pointing stick

■ TouchPad

■ Trusted platform module (TPM) security module

⚠ **CAUTION:** To properly ventilate the notebook, allow at least a 7.6-cm (3-inch) clearance on the left and right sides of the notebook.

The notebook uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to be turned on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software applications. Exhaust air is displaced through the ventilation grill located on the left side of the notebook.

2

Troubleshooting

⚠ **WARNING:** Only authorized technicians trained by HP should repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly-/module-level repair. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indication of component replacement or printed wiring board modification may void any warranty or exchange allowances.

2.1 Computer Setup

Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load. If the operating system is working, the notebook restarts the operating system after you exit Computer Setup.

✎ Pointing devices are not supported in Computer Setup; you must use the keyboard to navigate and make selections.

The menu tables later in this chapter provide an overview of Computer Setup options.

Accessing Computer Setup

The information and settings in Computer Setup are accessed from the **File**, **Security**, **Tools**, and **Advanced** menus.

1. Open Computer Setup by turning on or restarting the notebook. Press **f10** while the F10 = Based Setup message is displayed in the lower-left corner of the screen.

   ❏ To change the language, press **f2**.

   ❏ To view navigation information, press **f1**.

   ❏ To return to the Computer Setup menu, press **esc**.

2. Select the **File**, **Security**, **Tools**, or **Advanced** menu.

3. To exit Computer Setup, choose one of the following:

   ❏ To exit without saving any changes, use the arrow keys to select **File > Ignore changes and exit**, and then follow the instructions on the screen.

   ❏ To exit and save all the settings you have entered, use the arrow keys to select **File > Save changes and exit**, and then follow the instructions on the screen.

Your preferences are set when you exit Computer Setup and take effect when the notebook restarts.

Computer Setup Defaults

To return all settings in Computer Setup to the values that were set at the factory:

1. Open Computer Setup by turning on or restarting the notebook. Press **f10** while the F10 = Based Setup message is displayed in the lower-left corner of the screen.

   ❏ To change the language, press **f2**.

   ❏ To view navigation information, press **f1**.

2. Use the arrow keys to select **File > Restore defaults**.

3. Select the **Restore Defaults** check box.

4. To confirm the restoration, press **f10**.

5. Select **File > Save changes and exit**, and then follow the instructions on the screen.

When the computer restarts, the factory settings are restored, and any identification information you have entered is saved.

Selecting from the File Menu

Table 2-1

File Menu

Select	To Do This
System Information	■ View identification information about the notebook and any battery packs in the system. ■ View specification information about the processor, memory and cache size, video revision, keyboard controller version, and system ROM.
Save to floppy	Save system configuration settings to a diskette.
Restore from floppy	Restore system configuration settings from a diskette.
Restore defaults	Replace configuration settings in Computer Setup with factory default settings. (Identification information is retained.)
Ignore changes and exit	Cancel changes entered during the current session. Then exit and restart the notebook.
Save changes and exit	Save changes entered during the current session. Then exit and restart the notebook. The changes you save are in effect when the notebook restarts.

Selecting from the Security Menu

Table 2-2

Security Menu

Select	To Do This
Administrator password	Enter, change, or delete an HP Administrator password.
Power-on password	Enter, change, or delete a power-on password.
Password options	■ Enable/Disable stringent security. ■ Enable/Disable required password on restart.
DriveLock passwords	Enable/disable DriveLock; change a DriveLock user or master password. ✎ DriveLock Settings are accessible only when you enter Computer Setup by turning on (not restarting) the notebook.
Smart Card Security	Enable/disable power-on support for smart cards. ✎ This feature is supported by select smart card readers only.
Embedded Security	■ Enable/Disable the embedded security chip. ■ Restore embedded security chip to factory settings. ■ Enable/Disable power-on authentication support. ■ Enable/Disable automatic DriveLock. ■ Reset power-on authentication credential ✎ Embedded Security settings are accessible only if the notebook is equipped with an embedded security chip.
Device security	Enable/Disable devices in the system. Enable NIC for inclusion in MultiBoot.
System IDs	Enter user-defined identification values.

Selecting from the Tools Menu

Table 2-3

Tools Menu

Select	To Do This
HDD Self Test options	Run a quick or comprehensive self-test on any hard drive in the system.
Battery Information	View information about any battery packs in the notebook.
Memory Check	■ Run a self-test on memory modules in the notebook. ■ View information about memory modules installed in the notebook.

Selecting from the Advanced Menu

Table 2-4

Advanced Menu

Select	To Do This
Language (or press **f2**)	Change the Computer Setup language.
Boot options	■ Enable/Disable MultiBoot, which sets a startup sequence that can include most bootable devices and media in the system. ■ Set the boot order.

Device options	■ Swap the functions of the **fn** key and left **ctrl** key.
	■ Enable/Disable multiple pointing devices at startup. (To set the notebook to support only a single, usually nonstandard, pointing device at startup, select **Disable**.)
	■ Enable/Disable USB legacy support for a USB keyboard, mouse, and hub. When USB legacy support is enabled
	  ❐ A USB keyboard, mouse, and hub work even when a Windows operating system is not loaded.
	  ❐ The notebook starts from a bootable hard drive, diskette drive diskette, or CD, CD-RW, or DVD inserted into a drive connected by a USB connector to the notebook or to an optional docking device.
	■ Select a parallel port mode: EPP (Enhanced Parallel Port), standard, bidirectional, or ECP (Enhanced Capabilities Port).
	■ Enable/Disable all settings in the **SpeedStep** window. (When Disable is selected, the notebook runs in Battery Optimized mode.)

2.2 Troubleshooting Flowcharts

Table 2-5

Troubleshooting Flowcharts Overview

Flowchart	Description
2.1	"Flowchart 2.1—Initial Troubleshooting"
2.2	"Flowchart 2.2—No Power, Part 1"
2.3	"Flowchart 2.3—No Power, Part 2"
2.4	"Flowchart 2.4—No Power, Part 3"
2.5	"Flowchart 2.5—No Power, Part 4"
2.6	"Flowchart 2.6—No Video, Part 1"
2.7	"Flowchart 2.7—No Video, Part 2"
2.8	"Flowchart 2.8—Nonfunctioning Docking Device (if applicable)"
2.9	"Flowchart 2.9—No Operating System (OS) Loading"
2.10	"Flowchart 2.10—No OS Loading, Hard Drive, Part 1"
2.11	"Flowchart 2.11—No OS Loading, Hard Drive, Part 2"
2.12	"Flowchart 2.12—No OS Loading, Hard Drive, Part 3"
2.13	"Flowchart 2.13—No OS Loading, Diskette Drive"

Table 2-5

Troubleshooting Flowcharts Overview *(Continued)*

Flowchart	Description
2.14	"Flowchart 2.14—No OS Loading, Optical Drive"
2.15	"Flowchart 2.15—No Audio, Part 1"
2.16	"Flowchart 2.16—No Audio, Part 2"
2.17	"Flowchart 2.17—Nonfunctioning Device"
2.18	"Flowchart 2.18—Nonfunctioning Keyboard"
2.19	"Flowchart 2.19—Nonfunctioning Pointing Device"
2.20	"Flowchart 2.20—No Network/Modem Connection"

Flowchart 2.1—Initial Troubleshooting

```
        ┌──────────────────┐
        │      Begin       │
        │ troubleshooting. │
        └──────────────────┘
                 │
                 ▼
             ╱ Is there ╲      N      ┌─────────────────┐
            ╱   power?   ╲────────────▶│     Go to       │
            ╲            ╱             │  "Flowchart     │
             ╲          ╱              │  2.2—No Power,  │
               │ Y                     │    Part 1."     │
               ▼                       └─────────────────┘
           ╱ Beeps,  ╲        N       ┌─────────────────┐
          ╱  LEDs, or  ╲──────────────▶│     Check       │
          ╲ error      ╱              │  LED board,     │
           ╲ messages?╱               │  speaker        │
             │ Y                      │  connections.   │
             ▼                        └─────────────────┘
         ╱ Is there video? ╲  N       ┌─────────────────┐
        ╱    (no boot)      ╲─────────▶│     Go to       │
        ╲                   ╱          │  "Flowchart     │
          │ Y                          │  2.6—No Video,  │
          ▼                            │    Part 1."     │
       ╱ Is the OS ╲        N          └─────────────────┘
      ╱  loading?   ╲──────────────────▶  Go to
      ╲             ╱                    "Flowchart
        │ Y                              2.9—No Operating
        ▼                                System (OS)
     ╱ Is there ╲       N                Loading."
    ╱   sound?    ╲─────────────────────▶ Go to
    ╲             ╱                       "Flowchart
      │ Y                                 2.15—No Audio,
                                          Part 1."
```

```
   ╱ All drives ╲     N     ┌──────────────────┐
  ╱  working?    ╲──────────▶│     Go to        │
  ╲             ╱           │  "Flowchart      │
    │ Y                     │  2.17—Nonfunction│
    ▼                       │  ing Device."    │
  ╱ Keyboard/ ╲     N       └──────────────────┘
 ╱  pointing   ╲────────────▶  Go to
 ╲  device     ╱             "Flowchart
  ╲ working?  ╱              2.18—Nonfunction
    │ Y                      ing Keyboard" or
    ▼                        "Flowchart
  ╱ Connecting ╲    N        2.19—Nonfunction
 ╱  to network  ╲───────────▶ ing Pointing
 ╲  or modem?  ╱             Device."
   │ Y                       Go to
   ▼                         "Flowchart
 ┌────────┐                  2.20—No
 │  End   │                  Network/Modem
 └────────┘                  Connection."
```

Flowchart 2.2—No Power, Part 1

No power (power LED is off).

↓

Remove from docking device (if applicable).

↓

Power up on battery power? —N→ Reset power.* —→ Power up on battery power? —N→ Go to "Flowchart 2.3—No Power, Part 2."

Y↓ (battery power) Y↓

Power up on AC power? —N→ Reset power.* —→ Power up on AC power? —N→ Go to "Flowchart 2.4—No Power, Part 3."

Y↓ Y↓

Power up in docking device? —Y→ Done

N↓

1. Reseat the power cables in the docking device and at the AC outlet.
2. Ensure the AC power source is active.
3. Ensure that the power strip is working.

↓

Done ←Y— Power up in docking device? —N→ Go to "Flowchart 2.8—Nonfunctioning Docking Device (if applicable)."

*NOTES
1. On select models, there is a separate reset button.
2. On select models, the notebook can be reset using the standby switch and either the lid switch or the main power switch.

Flowchart 2.3—No Power, Part 2

Flowchart 2.4—No Power, Part 3

```
Continued from
"Flowchart
2.3—No Power,
Part 2."
        │
        ▼
Plug directly
into AC outlet.
        │
        ▼
    ◇ Power LED ──Y──▶ Done
      on? ◇
        │ N
        ▼
Reseat AC adapter
in notebook and
at power source.
        │
        ▼
    ◇ Power on? ──Y──▶ Done
        │ N
        ▼
    ◇ Power outlet ──N──▶ Try different
      active? ◇            outlet.
        │ Y
        ▼
Replace
power cord.
        │
        ▼
    ◇ Power on? ──Y──▶ Done
        │ N

    ◇ Internal or ──External──▶ Replace external
      external AC              AC adapter.
      adapter? ◇                    │
        │ Internal                  ▼
        ▼                      ◇ Power on? ◇ ──N──
    Go to                           │ Y
    "Flowchart                      ▼
    2.5—No Power,                  Done
    Part 4."
```

Flowchart 2.5—No Power, Part 4

```
┌─────────────────┐
│ Continued from  │
│  "Flowchart     │
│ 2.4—No Power,   │
│    Part 3."     │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│     Open        │
│   notebook.     │
└─────────────────┘
         │
         ▼
      ╱─────╲              Y      ┌─────────────────┐
     ╱ Loose  ╲───────────────────│  Reseat loose   │
    ╱    or     ╲                 │ components and  │
    ╲ damaged   ╱                 │    boards and   │
     ╲ parts?  ╱                  │ replace damaged │
      ╲───────╱                   │     items.      │
         │ N                      └─────────────────┘
         ▼
┌─────────────────┐
│     Close       │
│  notebook and   │
│     retest.     │
└─────────────────┘
         │
         ▼         N
      ╱─────╲              ┌──────────────────────────────────────────┐
     ╱       ╲─────────────│ Replace the following items (if applicable). Check │
    ╱ Power   ╲            │ notebook operation after each replacement:          │
    ╲  on?    ╱            │ 1. Internal DC-DC converter*                        │
     ╲       ╱             │ 2. Internal AC adapter                              │
      ╲─────╱              │ 3. Processor board*                                 │
         │ Y              │ 4. System board*                                    │
         ▼                │                                                     │
┌─────────────────┐       │ *NOTE: Replace these items as a set to prevent      │
│      Done       │       │ shorting out among components.                      │
└─────────────────┘       └──────────────────────────────────────────┘
```

Flowchart 2.6—No Video, Part 1

No video.

Stand-alone or docking device?

Docking Device → Go to "Flowchart 2.7—No Video, Part 2."

*NOTE: To change from internal to external display, use the hotkey combination.

Stand-alone

Internal or external display*?

Internal → Adjust brightness.

A

Video OK?

Y → Done

N

Press lid switch to ensure operation.

Video OK?

Y → Done

N

External

Adjust brightness.

Video OK?

Y → Done

N

Check for bent pins on cable.

Replace the following one at a time. Test after each replacement.
1. Cable between notebook and notebook display (if applicable)
2. Display
3. System board

Video OK?

N → Try another display.

Y

Done

Internal and external video OK?

N → Replace system board.

Y

Done

Flowchart 2.7—No Video, Part 2

Continued from "Flowchart 2.6—No Video, Part 1."

↓

Remove notebook from docking device, if connected.

↓

Adjust display brightness.

↓

Video OK?
— N → Go to "A" in "Flowchart 2.6—No Video, Part 1."

Y ↓

Check that notebook is properly seated in docking device, for bent pins on cable, and for monitor connection.

↓

Video OK?
— Y → Done

N ↓

Adjust external monitor display.

Check brightness of external monitor.

↓

Video OK?
— Y → Done

N ↓

Try another external monitor.

↓

Internal and external video OK?
— Y → Done

N ↓

Go to "Flowchart 2.8—Nonfunctioning Docking Device (if applicable)."

Flowchart 2.8—Nonfunctioning Docking Device (if applicable)

```
┌─────────────────┐
│  Nonfunctioning │
│ docking device. │
└────────┬────────┘
         │
         ▼
┌─────────────────┐
│  Reseat power   │
│ cord in docking │
│   device and    │
│  power outlet.  │
└────────┬────────┘
         │
         ▼
┌─────────────────┐         ┌─────────────────┐
│  Check voltage  │         │    Reinstall    │
│setting on docking│        │ notebook into   │
│     device.     │         │ docking device. │
└────────┬────────┘         └────────┬────────┘
         │                           │
         ▼                           ▼
┌─────────────────┐            ◇ Docking ◇      Y    ┌──────────┐
│  Reset monitor  │            ◇  device  ◇ ───────▶ │   Done   │
│cable connector at│           ◇operating?◇          └──────────┘
│ docking device. │              N │
└────────┬────────┘                │
         │                         ▼
    ◇ Docking ◇    Y  ┌──────────┐  ┌─────────────────┐
    ◇  device  ◇ ───▶ │   Done   │  │Test replacement │
    ◇operating?◇      └──────────┘  │docking device with│
      N │                           │  new notebook.  │
        ▼                           └─────────────────┘
┌─────────────────┐
│Remove notebook, │
│replace docking  │
│    device.      │
└─────────────────┘
```

Flowchart 2.9—No Operating System (OS) Loading

```
┌─────────────┐
│  No OS      │
│  loading.*  │
└─────────────┘
       │
       ▼
┌─────────────┐
│ Reseat power│
│ cord in     │
│ docking     │
│ device and  │
│ power outlet│
└─────────────┘
```

No OS loading from hard drive,
go to "Flowchart 2.10—No OS Loading, Hard Drive, Part 1."

No OS loading from diskette drive,
go to "Flowchart 2.13—No OS Loading, Diskette Drive."

No OS loading from optical drive,
go to "Flowchart 2.14—No OS Loading, Optical Drive."

No OS loading from network,
go to "Flowchart 2.20—No Network/Modem Connection."

*NOTE: Before beginning troubleshooting, always check cable connections, cable ends, and drives for bent or damaged pins.

Flowchart 2.10—No OS Loading, Hard Drive, Part 1

Flowchart 2.11—No OS Loading, Hard Drive, Part 2

Continued from "Flowchart 2.10—No OS Loading, Hard Drive, Part 1."

Disc or diskette in drive?

N → 1. Replace hard drive. 2. Replace system board.

Y → Remove disc or diskette and reboot.

Boot from hard drive?

Y → Done

N → Boot from diskette drive?

N → Go to "Flowchart 2.13—No OS Loading, Diskette Drive."

Y → Hard drive accessible?

N → Done

Y → Go to "Flowchart 2.12—No OS Loading, Hard Drive, Part 3."

Reseat hard drive.

Hard drive accessible?

Y → Done

N → Run FDISK.

Hard drive partitioned?

N → Create partition, and then format hard drive to bootable C:\ prompt.

Y → Hard drive formatted?

N → Format hard drive and bring to a bootable C:\ prompt.

Y → Notebook booted?

Load OS using *Operating System* disc (if applicable).

Notebook booted?

Y → Done

N → Go to "Flowchart 2.12—No OS Loading, Hard Drive, Part 3."

Flowchart 2.12—No OS Loading, Hard Drive, Part 3

```
Continued from
"Flowchart
2.11—No OS
Loading,
Hard Drive, Part 2."
```

System files on hard drive? — N → Install OS and reboot.

Y ↓

Virus on hard drive? — Y → Clean virus. → OS loading from hard drive? — Y → Done

N ↓

OS loading from hard drive? — N ↓

Diagnostics on disc or diskette? — Y → Replace hard drive.

N ↓

Run diagnostics and follow recommendations.

Run SCANDISK and check for bad sectors.

↓

Can bad sectors be fixed? — N → Replace hard drive.

Y ↓

Fix bad sectors. → Boot from hard drive? — N → Replace hard drive.

Y ↓

Done

Flowchart 2.13—No OS Loading, Diskette Drive

Flowchart 2.14—No OS Loading, Optical Drive

```
┌──────────────┐         Y                    N      ┌──────────────┐
│ No OS        │      ╱Disc  ╲         ╱Bootable╲     │ Install      │
│ loading from │─────▶ in drive? ─────▶ disc in  ─────▶ bootable     │
│ CD-ROM or    │      ╲       ╱         ╲ drive? ╱     │ disc and     │
│ DVD-ROM drive│         │              │             │ reboot       │
└──────────────┘         │              │             │ notebook.    │
                    N    │         Y    │             └──────────────┘
                         ▼              ▼
                  ┌──────────┐   ┌──────────────┐
                  │ Install  │   │ Try another  │
                  │ bootable │   │ bootable disc│
                  │ disc.    │   └──────────────┘
                  └──────────┘
```

```
         Y
  ╱Boots from╲      ┌──────────┐
  ─ CD or DVD? ─────▶   Done   │
  ╲          ╱      └──────────┘
N    │
     ▼
┌──────────┐        Y
│ Reseat   │   ╱Boots from╲     ┌──────────┐
│ drive.   │──▶ CD or DVD? ─────▶   Done   │
└──────────┘   ╲          ╱     └──────────┘
                  │
             N    │
                  ▼                 N
             ╱Booting  ╲        ┌──────────────────┐
             ╱ from another ─────▶ Go to            │
             ╲ device?  ╱        │ "Flowchart       │
                  │              │ 2.17—Nonfunctioning│
             Y    │              │ Device."         │
                  ▼              └──────────────────┘
             ╱Booting  ╲   Y   ┌──────────────┐    ┌──────────────────┐
             ╱ order     ─────▶ Reset the     │    │ Go to            │
             ╲ correct? ╱      │ notebook.    │───▶│ "Flowchart       │
                  │            │ Refer to     │    │ 2.17—Nonfunctioning│
             N    │            │ Section 1.2, │    │ Device."         │
                  ▼            │ "Resetting the│   └──────────────────┘
             ┌──────────┐      │ Notebook," for│
             │ Correct  │      │ instructions.│
             │ boot     │      └──────────────┘
             │ order    │
             │ using    │
             │ the Setup│
             │ utility. │
             └──────────┘
```

Flowchart 2.15—No Audio, Part 1

Flowchart 2.16—No Audio, Part 2

Continued from *"Flowchart 2.15—No Audio, Part 1."*

Audio driver in OS configured?

N → Reload audio drivers.

Y

Correct drivers for application?

N → Load drivers and set configuration in OS.

Y

Connect to external speaker.

Audio?

N → Replace audio board and speaker connections in notebook (if applicable).

Audio?

Y → Done

N → Replace the following components individually, retesting after each replacement:
■ Internal speakers.
■ Audio board (if applicable).

Y

Flowchart 2.17—Nonfunctioning Device

```
                    ┌─────────────────┐
                    │  Nonfunctioning │
                    │     device.     │
                    └────────┬────────┘
                             │
                    ┌────────▼────────┐
                    │     Reseat      │
                    │     device.     │
                    └────────┬────────┘
                             │
        ┌────────────────────▼────────────────────┐
        │ Unplug the nonfunctioning device from    │
        │ the notebook and inspect cables and plugs│
        │ for bent or broken pins or other damage. │
        └────────────────────┬────────────────────┘
                             │        Y
┌──────────┐          ◇───────────◇          ┌──────────┐
│  Clear   │◄─────────│ Any physical │────────►│  Fix or  │
│  CMOS.   │          │device detected?         │ replace  │
└────┬─────┘          ◇───────────◇          │broken item│
     │                      N                 └──────────┘
     │
┌────▼──────┐                                 ┌──────────────┐
│Reattach   │    ┌──────────────┐             │   Go to      │
│device.    │    │Replace hard  │             │"Flowchart    │
│Close      │    │drive.        │             │2.9—No        │
│notebook,  │    └──────────────┘             │Operating     │
│plug in    │                                 │System (OS)   │
│power, and │                                 │Loading."     │
│reboot.    │                                 └──────────────┘
└────┬──────┘
     │       N
  ◇──────◇        ┌──────────────┐                         N
  │Device │──────►│Replace NIC.  │──────► ◇──────◇
  │boots  │       │If integrated │        │Device │
  │properly?      │NIC, replace  │        │boots  │
  ◇──────◇        │system board. │        │properly?
     │ Y          └──────────────┘        ◇──────◇
     │                                       │ Y
┌────▼─────┐    ┌──────────────┐         ┌───▼────┐
│   Done   │    │Replace       │         │  Done  │
└──────────┘    │diskette drive│         └────────┘
                └──────────────┘
```

Flowchart 2.18—Nonfunctioning Keyboard

Keyboard not operating properly.

↓

Connect notebook to good external keyboard.

↓

External device works?

→ N → Replace system board.

↓ Y

Reseat internal keyboard connector (if applicable).

↓

Keyboard operating properly?

→ N → Replace internal keyboard or cable.

↓ Y

Done

Replace internal keyboard or cable. ↓

Keyboard operating properly?

→ Y → Done

↓ N

Replace system board.

Flowchart 2.19—Nonfunctioning Pointing Device

```
┌─────────────────┐
│ Pointing device │
│  not operating  │
│    properly.    │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│ Connect notebook│
│ to good external│
│ pointing device.│
└─────────────────┘
         │
         ▼                  N        ┌─────────────┐
        ◇ External ◇ ──────────────▶ │   Replace   │
        ◇ device   ◇                 │   system    │
        ◇ works?   ◇                 │   board.    │
         │                           └─────────────┘
        Y│
         ▼
┌─────────────────┐
│ Reseat internal │
│ pointing device │
│    connector    │
│ (if applicable).│
└─────────────────┘
         │
         ▼               N      ┌──────────────────┐
     ◇ Pointing  ◇ ───────────▶│ Replace internal │
     ◇  device   ◇             │ pointing device  │
     ◇ operating ◇             │    or cable.     │
     ◇ properly? ◇             └──────────────────┘
        Y│                              │
         ▼                              ▼              Y    ┌──────┐
┌─────────────┐                   ◇ Pointing  ◇ ──────────▶│ Done │
│    Done     │                   ◇  device   ◇            └──────┘
└─────────────┘                   ◇ operating ◇
                                  ◇ properly? ◇
                                    N│
                                     ▼
                              ┌─────────────┐
                              │   Replace   │
                              │   system    │
                              │   board.    │
                              └─────────────┘
```

Flowchart 2.20—No Network/Modem Connection

3

Software Update and Recovery

Software Updates

To stay current with the newest technology and maintain optimal performance, install the latest versions of HP software on your computer as they become available.

To update HP software:

1. Identify your computer model, product category, and series or family. Prepare for a system BIOS update by identifying the BIOS version currently installed on the computer.

△ **CAUTION:** If your computer is connected to a network, it is recommended that you consult with your network administrator before installing any software updates, especially system BIOS updates.

✎ The computer system BIOS is stored on the system ROM. The BIOS initializes the operating system, determines how the computer will interact with the hardware devices, and provides for data transfer among hardware devices, including the time and date.

2. Access the updates through the HP Web site (http://www.hp.com) or the *Support Software* disc (purchased separately).

3. Install the updates.

Accessing Computer Information

Before you access the updates for your computer, collect the following information:

■ The product *category* is Notebook.

■ The product *family* name and *series* number are printed on the display bezel.

■ *Model* information is provided on the serial number label on the bottom of the computer.

To determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

BIOS version information (also known as ROM date and System BIOS) can be displayed by pressing **fn+esc** (if you are already in Microsoft Windows) or by opening Computer Setup.

To use Computer Setup for displaying BIOS information:

1. Open Computer Setup by turning on or restarting the computer, and then pressing **f10** while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.

2. Use the arrow keys to select **File > System Information**, and then press **enter**.

   BIOS date information is displayed.

3. To exit Computer Setup, use the arrow keys to select **File > Ignore changes and exit**. Then follow the instructions on the screen.

Obtaining the Support Software Disc

The *Support Software* disc provides HP software updates and installation instructions. The disc includes device drivers, BIOS updates, and utilities.

To purchase the current *Support Software* disc or a subscription that provides both the current version and future versions of the disc, visit the HP Web site at http://www.hp.com.

Software Updates and the HP Web Site

Most software on the HP Web site is packaged in a compressed file called a *SoftPaq*. Some BIOS updates may be packaged in a compressed file called a *ROMPaq*.

Most download packages contain a file named Readme.txt. A Readme.txt file contains information regarding installing and troubleshooting the file. The Readme.txt files included with ROMPaqs are provided in English only.

Downloading a BIOS Update

Ä **CAUTION:** To prevent damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation:

■ Do not disconnect power from the computer by unplugging the power cord from the AC outlet.

■ Do not shut down the computer or initiate standby or hibernation.

■ Do not insert, remove, connect, or disconnect any device, cable, or cord.

To download a BIOS update:

1. Access the page on the HP Web site that provides software for your computer:

   ❏ Select **Start > Help and Support**, and then click a software update link.

   – or –

   ❏ Visit the HP Web site at http://www.hp.com/support.

2. Follow the instructions on the screen to identify your computer and access the BIOS update you want to download.

3. At the download area:

   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the instructions on the screen to download your selection to the hard drive.

✎ Make a note of the path to the location on your hard drive where the BIOS update will be downloaded. You will need to access this path when you are ready to install the update.

Installing a BIOS Update

⚠ **CAUTION:** If your computer is connected to a network, it is recommended that you consult with your network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete. If no instructions are displayed:

1. Open Windows Explorer by selecting **Start > All Programs > Accessories > Windows Explorer**.

2. In the left pane of the Windows Explorer window:

   a. Click **My Computer** and then your hard drive designation. The hard drive designation is typically Local Disk (C:).

   b. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.

3. Double-click the file with an .exe extension (for example, filename.exe).

   The BIOS installation begins.

4. Complete the installation by following the instructions on the screen.

✎ After a message on the screen reports a successful installation, you may delete the downloaded file from your hard drive.

Recovering the BIOS

✎ The BIOS recovery procedure requires a USB diskette drive and a formatted diskette.

The BIOS can be recovered if the flash memory is corrupted. Flash memory corruption can occur if the notebook powers down while the BIOS is being updated.

When the notebook is turned on, the boot block portion of the flash memory performs an integrity check on the rest of the BIOS image and enters recovery mode if the image is corrupt.

BIOS recovery can be forced on a non-functioning notebook by turning on the notebook while pressing and holding the Windows logo key + **B** on the nonfunctioning notebook keyboard until the caps lock light blinks.

To recover the BIOS:

1. If the nonfunctioning notebook is docked in an optional docking device, undock the notebook.

2. Attach the USB diskette drive directly to a USB port on the nonfunctioning notebook. (USB hubs are not supported for BIOS recovery).

3. Insert the correct ROMPaq diskette for the product being updated. The BIOS image file must be located in the root directory of the diskette and must be in contiguous sectors. The easiest way to ensure this is to visit http://www.hp.com, download the Softpaq, and let the Softpaq create the ROMPaq diskette.

4. Press and hold the Windows logo key + **B** on the notebook keyboard (do not use an external keyboard) and turn on the notebook and wait for the caps lock light to start blinking.

5. Release the Windows logo key + **B**.

   The BIOS recovery procedure takes approximately one minute to read the image from the diskette, and then an additional 15 seconds to program the image into flash memory. The notebook restarts when the BIOS recovery procedure is complete. Do not attempt to turn off the notebook after starting a recovery.

   If the BIOS recovery procedure stalls, the caps lock light will begin blinking. This situation can arise if the diskette is corrupt or the incorrect ROMPaq is used. If the notebook does not restart after approximately 3 minutes, press and hold the power button, or slide and hold the power switch, for at least 5 seconds to force the notebook to turn itself off. Then repeat the BIOS recovery procedure.

4

Illustrated Parts Catalog

This chapter provides an illustrated parts breakdown and a reference for spare part numbers.

4.1 Serial Number Location

When ordering parts or requesting information, provide the notebook serial number and model number located on the bottom of the notebook.
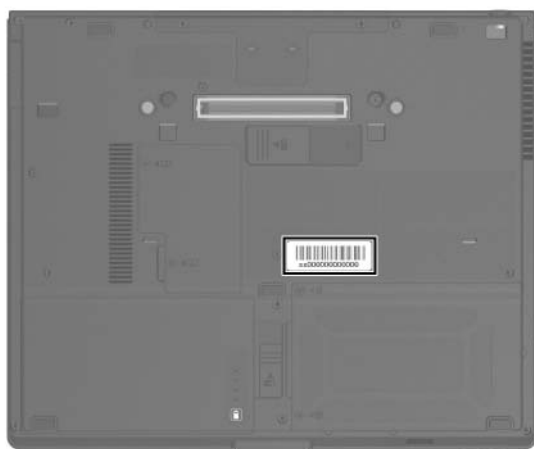
Serial Number Location

4.2 Notebook Major Components
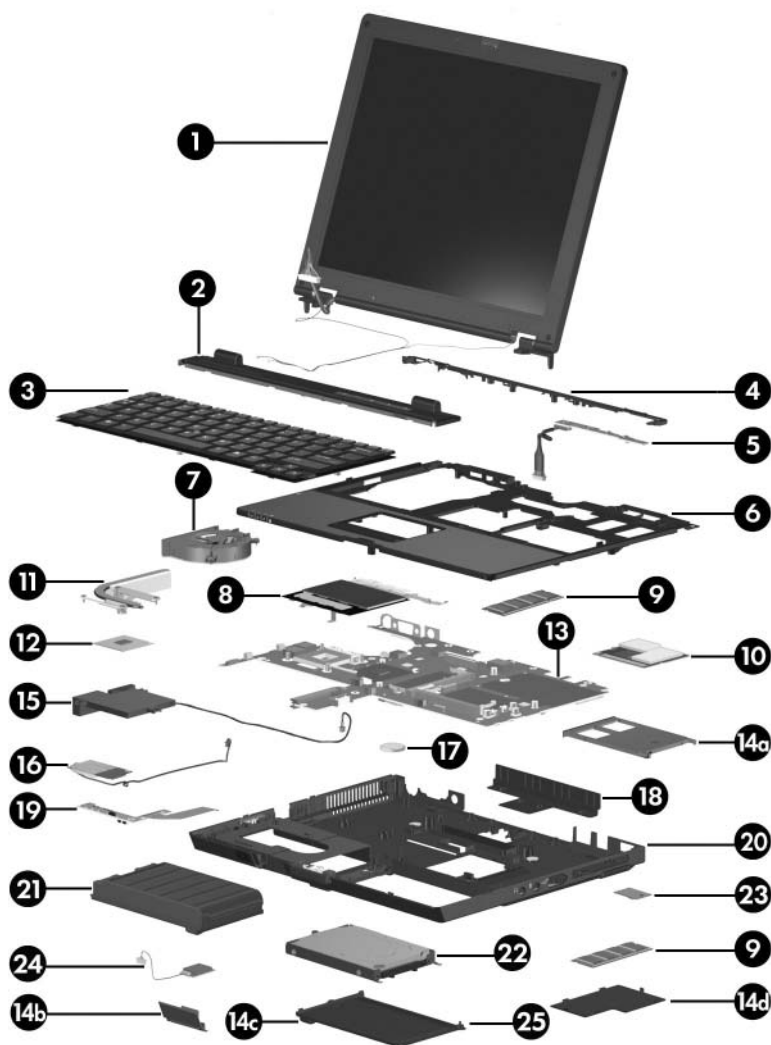
Notebook Major Components

Table 4-1

Spare Parts: Notebook Major Components

Item	Description		Spare Part Number
1	**12.1-inch, XGA, TFT display assembly** (includes wireless antenna boards and cables)		383547-001
	Display Hinge Kit (not illustrated)		383530-001
2	**Keyboard cover**		383519-001
3	**Keyboards**, with pointing stick		

Asia Pacific	383458-371	Norway	383458-091
Australia	383458-011	People's Republic of China	383458-AA1
Belgium	383458-181		
Czech Republic	383458-221		
Denmark	383458-081	Poland	383458-241
Europe	383458-021	Portugal	383458-131
France	383458-051	Russia	383458-251
French Canada	383458-121	Saudi Arabia	383458-171
Germany	383458-041	Spain	383458-071
Hong Kong	383458-AC1	Slovakia	383458-231
Hungary	383458-211	Sweden	383458-101
Iceland	383458-DD1	Switzerland	383458-111
Israel	383458-BB1	Taiwan	383458-AB1
Italy	383458-061	Thailand	383458-281
Japan	383458-291	Turkey	383458-141
Korea	383458-AD1	United Kingdom	383458-031
Latin America	383458-161	United States	383458-001
The Netherlands	383458-331		

Notebook Major Components

Table 4-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description	Spare Part Number
4	**Rear keyboard cover**	383522-001
5	**Button board** (includes button board cable)	383511-001
6	**Top cover**	383560-001
7	**Fan**	383528-001
8	**TouchPad** (includes cable and bracket)	383562-001
9	**Memory modules**	
	PC24200	
	1024 MB	383536-001
	512 MB	383542-001
	256 MB	383538-001
	PC23200	
	1024 MB	383535-001
	512 MB	383541-001
	256 MB	383537-001
10	**Mini PCI communications cards**	
	802.11b/g Silverton wireless local access network (WLAN) card, for use in most of the world	359106-001
	802.11b/g Silverton WLAN card, for use in the rest of the world	359107-001
	802.11a/b/g FRLN WLAN card, for use in Europe	377792-001
	802.11a/b/g FRLN WLAN card, for use in Japan	373888-291
	802.11a/b/g FRLN WLAN card, for use in most of the world	373888-001
	802.11a/b/g FRLN WLAN card, for use in ROW	373889-001
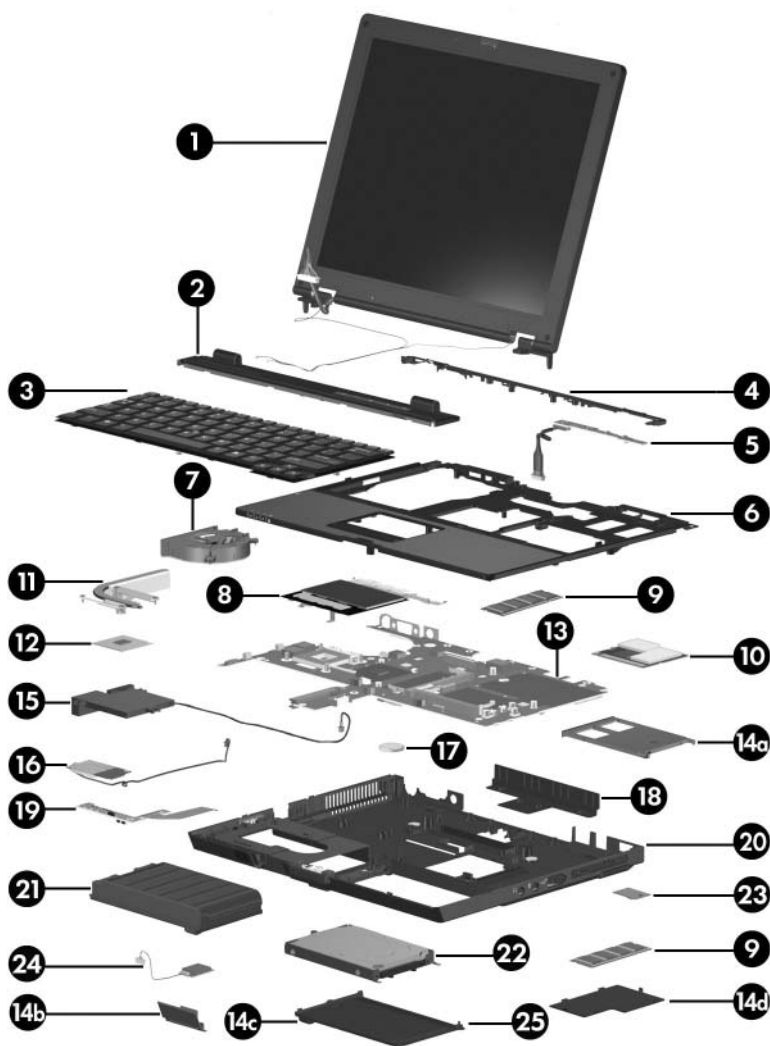
Notebook Major Components

Table 4-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description	Spare Part Number
10	**Mini PCI communications cards** *(Continued)*	
	802.11a/b/g DynaStar WLAN card, for use in Japan	337407-291
	802.11a/b/g DynaStar WLAN card, for use in most of the world	337407-001
		337407-002
	802.11a/b/g DynaStar WLAN card, for use in the rest of the world	
	802.11a/b/g ATMC WLAN card, for use in Japan	377408-291
	802.11a/b/g ATMC WLAN card, for use in MOW	377408-001
	802.11a/b/g ATMC WLAN card, for use in the rest of the world	377408-002
11	**Heat sink** (includes thermal paste)	383559-001
12	**Processors** (include thermal paste)	
	Intel Pentium M 2.13-GHz	383555-001
	Intel Pentium M 2.00-GHz	383554-001
	Intel Pentium M 1.86-GHz	383553-001
	Intel Pentium M 1.73-GHz	383552-001
	Intel Pentium M 1.60-GHz	383551-001
	Intel Celeron M 1.50-GHz	384144-001
13	**System board**	383515-001
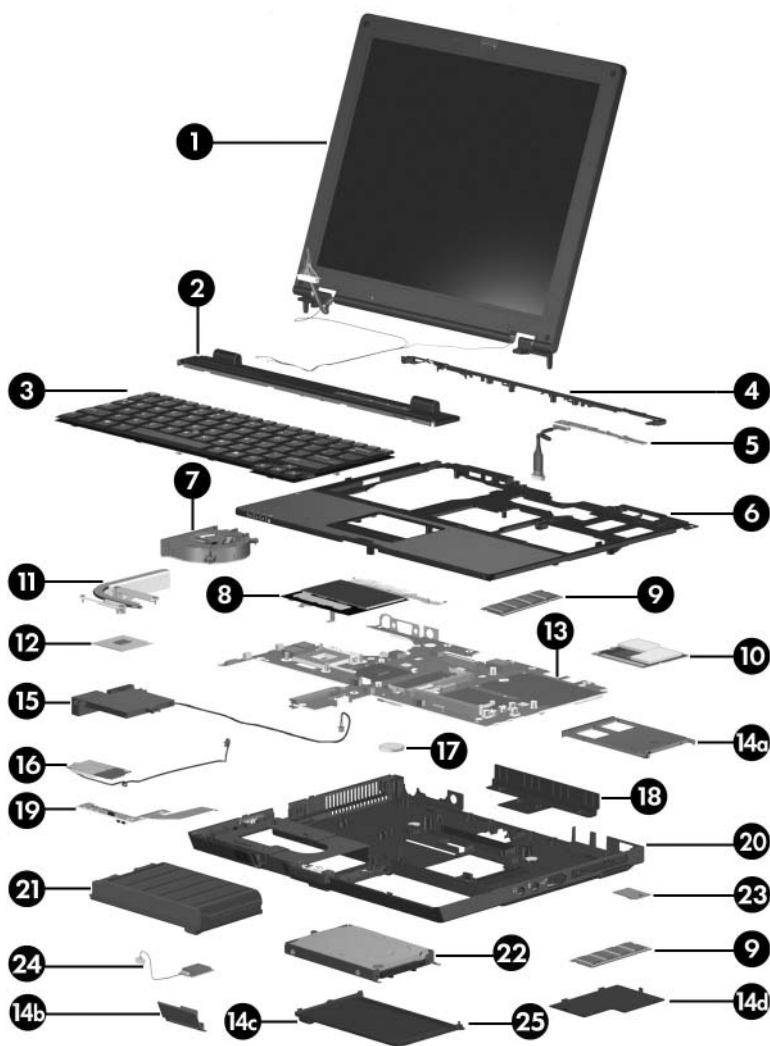
Notebook Major Components

Table 4-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description	Spare Part Number
	Miscellaneous Plastics/Hardware Kit, includes:	383549-001
14a	PC Card slot spacer	
14b	Bluetooth board cover	
14c	Hard drive cover	
14d	Memory module compartment cover	
	Not illustrated:	
	Notebook feet	
15	**Speaker**	383557-001
16	**Modem board** (high-speed 56K, includes modem cable)	383534-001
17	**RTC battery**	383625-001
18	**Base enclosure cover**	383520-001
19	**Infrared board** (includes cable)	383512-001
20	**Base enclosure**	383509-001
21	**6-cell battery pack**	383510-001
22	**Hard drives** (all 5400 rpm; include cover, frame, and connector)	
	80-GB	383527-001
	60-GB	383526-001
	40-GB	383525-001
23	**TPM security module**	383545-001
24	**Bluetooth wireless module** (includes Bluetooth module cable)	370429-001
25	**Hard drive cover**	383529-001

4.3 Miscellaneous Plastics/ Hardware Kit
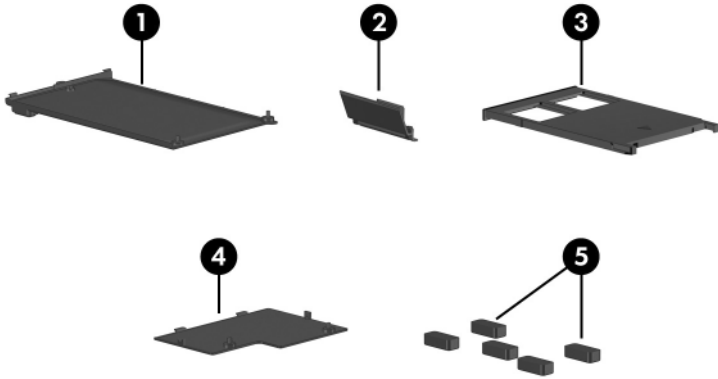
Table 4-2

Spare Part Number 383549-001

Item	Description
1	Hard drive cover
2	Bluetooth cover
3	PC Card slot space saver
4	Memory module compartment cover (includes 2 captive screws)
5	Notebook feet (5)

4.4 Miscellaneous Cable Kit
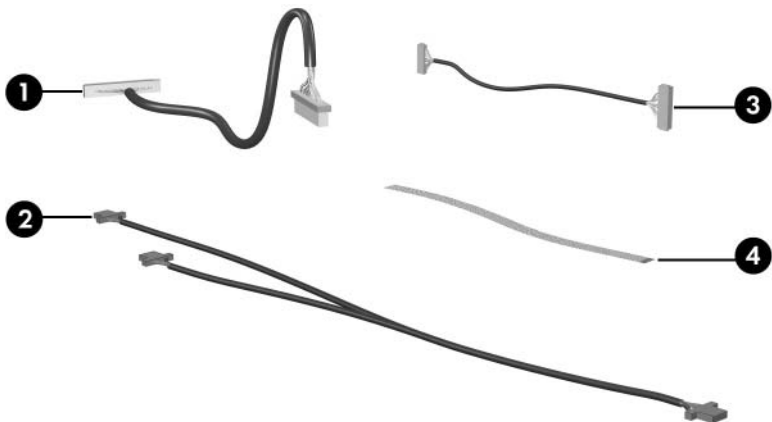
Table 4-3

Spare Part Number 383516-001

Item	Description
1	LED board cable
2	RJ-11 cable
3	TouchPad cable
4	Bluetooth cable

4.5 Miscellaneous (Not Illustrated)

Table 4-4

Miscellaneous Spare Part Information

Description	Spare Part Number
Label Kit	383533-001
Adjustable notebook stand	372420-001
Advanced Docking Station	374804-001
Docking Station	374803-001
Docking Station Miscellaneous Plastics Kit	380045-001
Power supply, 65 watt	338136-001
Power cords	
For use in:	
Australia and New Zealand	350188-011
Belgium, Europe, Greece, Norway, and Portugal	350188-021
Canada, French Canada, Latin America, Taiwan, Thailand, and the United States	350188-001
Denmark	350188-081
France	350188-051
Germany	350188-041
Hong Kong and the United Kingdom	350188-031
Israel	350188-BB1
Italy	350188-061
Japan	350188-291
The Netherlands	350188-331
People's Republic of China	350188-AA1

Table 4-4

Miscellaneous Spare Part Information *(Continued)*

Description	Spare Part Number
Saudi Arabia	350188-171
Spain	350188-071
Sweden/Finland	350188-B71
Screw Kit (includes the following screws; refer to Appendix C, "Screw Listing," for more information on specifications and usage	383556-001

- Phillips PM2.5×13.0 spring-loaded screw
- Phillips PM3.0×4.0 screw
- Phillips PM2.5×7.0 screw
- Phillips PM2.0×5.0 screw
- Phillips PM2.0×4.0 screw

- Phillips PM1.5×3.5 screw
- Torx 8 M2.0×18.0 screw
- Torx 8 M2.0×9.0 screw
- Torx 8 M2.0×7.5 screw
- Torx 8 M2.0×5.0 screw

4.6 Sequential Part Number Listing

Table 4-5

Sequential Part Number Listing

Spare Part Number	Description
337407-001	802.11a/b/g DynaStar WLAN Mini PCI communications card, for use in most of the world
337407-002	802.11a/b/g DynaStar WLAN Mini PCI communications card, for use in the rest of the world
337407-291	802.11a/b/g DynaStar WLAN Mini PCI communications card, for use in Japan
338136-001	65-watt power supply

Table 4-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
350188-001	Power cord for use in Canada, French Canada, Latin America, Taiwan, Thailand, and the United States
350188-011	Power cord for use in Australia and New Zealand
350188-021	Power cord for use in Belgium, Europe, Greece, Norway, and Portugal
350188-031	Power cord for use in Hong Kong and the United Kingdom
350188-041	Power cord for use in Germany
350188-051	Power cord for use in France
350188-061	Power cord for use in Italy
350188-071	Power cord for use in Spain
350188-081	Power cord for use in Denmark
350188-171	Power cord for use in Saudi Arabia
350188-291	Power cord for use in Japan
350188-331	Power cord for use in the Netherlands
350188-AA1	Power cord for use in People's Republic of China
350188-B71	Power cord for use in Sweden/Finland
350188-BB1	Power cord for use in Israel
359106-001	802.11b/g Silverton WLAN Mini PCI communications card, for use in most of the world
359107-001	802.11b/g Silverton WLAN card Mini PCI communications card, for use in the rest of the world
370429-001	Bluetooth wireless module (includes Bluetooth module cable)
373888-001	802.11a/b/g FRLN WLAN Mini PCI communications card, for use in most of the world

Table 4-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
373888-291	802.11a/b/g FRLN WLAN Mini PCI communications card, for use in Japan
373889-001	802.11a/b/g FRLN WLAN Mini PCI communications card, for use in the rest of the world
372420-001	Adjustable notebook stand
374803-001	Docking Station
374804-001	Advanced Docking Station
377408-001	802.11a/b/g ATMC WLAN Mini PCI communications card, for use in most of the world
377408-002	802.11a/b/g ATMC WLAN Mini PCI communications card, for use in the rest of the world
377408-291	802.11a/b/g ATMC WLAN Mini PCI communications card, for use in Japan
377792-001	802.11a/b/g FRLN WLAN Mini PCI communications card, for use in Europe
380045-001	Docking Station Miscellaneous Plastics Kit
383458-001	Keyboard with pointing stick for use in the United States
383458-011	Keyboard with pointing stick for use in Australia
383458-021	Keyboard with pointing stick for use in Europe
383458-031	Keyboard with pointing stick for use in the United Kingdom
383458-041	Keyboard with pointing stick for use in Germany
383458-051	Keyboard with pointing stick for use in France
383458-061	Keyboard with pointing stick for use in Italy
383458-071	Keyboard with pointing stick for use in Spain
383458-081	Keyboard with pointing stick for use in Denmark

Table 4-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
383458-091	Keyboard with pointing stick for use in Norway
383458-101	Keyboard with pointing stick for use in Sweden
383458-111	Keyboard with pointing stick for use in Switzerland
383458-121	Keyboard with pointing stick for use in French Canada
383458-131	Keyboard with pointing stick for use in Portugal
383458-141	Keyboard with pointing stick for use in Turkey
383458-171	Keyboard with pointing stick for use in Saudi Arabia
383458-181	Keyboard with pointing stick for use in Belgium
383458-211	Keyboard with pointing stick for use in Hungary
383458-221	Keyboard with pointing stick for use in Czech Republic
383458-231	Keyboard with pointing stick for use in Slovakia
383458-241	Keyboard with pointing stick for use in Poland
383458-251	Keyboard with pointing stick for use in Russia
383458-281	Keyboard with pointing stick for use in Thailand
383458-291	Keyboard with pointing stick for use in Japan
383458-371	Keyboard with pointing stick for use in Asia Pacific
383458-AA1	Keyboard with pointing stick for use in People's Republic of China
383458-AB1	Keyboard with pointing stick for use in Taiwan
383458-AC1	Keyboard with pointing stick for use in Hong Kong
383458-AD1	Keyboard with pointing stick for use in Korea
383458-BB1	Keyboard with pointing stick for use in Israel
383458-DD1	Keyboard with pointing stick for use in Iceland

Table 4-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
383509-001	Base enclosure
383510-001	6-cell battery pack
383511-001	Button board (includes button board cable)
383512-001	Infrared board (includes cable)
383515-001	System board
383516-001	Miscellaneous Cable Kit
383519-001	Keyboard cover
383520-001	Base enclosure cover
383522-001	Rear keyboard cover
383525-001	40-GB hard drive (5400 rpm; includes cover, frame, and connector)
383526-001	60-GB hard drive (5400 rpm; includes cover, frame, and connector)
383527-001	80-GB hard drive (5400 rpm; includes cover, frame, and connector)
383528-001	Fan
383529-001	Hard drive cover
383530-001	Display Hinge Kit
383534-001	Modem board (high-speed 56K, includes modem cable)
383535-001	PC23200 1024-MB memory module
383536-001	PC24200 1024-MB memory module
383537-001	PC23200 256-MB memory module
383538-001	PC24200 256-MB memory module
383541-001	PC23200 512-MB memory module

Table 4-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
383542-001	PC24200 512-MB memory module
383545-001	TPM security module
383547-001	12.1-inch, XGA, TFT display assembly (includes wireless antenna boards and cables)
383549-001	Miscellaneous Plastics/Hardware Kit
383551-001	Intel Pentium M 1.60-GHz processor (includes thermal paste)
383552-001	Intel Pentium M 1.73-GHz processor (includes thermal paste)
383553-001	Intel Pentium M 1.86-GHz processor (includes thermal paste)
383554-001	Intel Pentium M 2.00-GHz processor (includes thermal paste)
383555-001	Intel Pentium M 2.13-GHz processor (includes thermal paste)
383557-001	Speaker
383559-001	Heat sink
383560-001	Top cover
383562-001	TouchPad (includes cable and bracket)
383625-001	RTC battery
383533-001	Label Kit
383556-001	Screw Kit
384144-001	Intel Celeron M 1.50-GHz processor (includes thermal paste)

5

Removal and Replacement Preliminaries

This chapter provides essential information for proper and safe removal and replacement service.

5.1 Tools Required

You will need the following tools to complete the removal and replacement procedures:

■ Magnetic screwdriver
■ Phillips P0 screwdriver
■ Torx T8 screwdriver
■ Flat-bladed screwdriver
■ Tool kit—includes connector removal tool, loopback plugs, and case utility tool

5.2 Service Considerations

The following sections include some of the considerations that you should keep in mind during disassembly and assembly procedures.

✎ As you remove each subassembly from the notebook, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic Parts

Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and Connectors

△ **CAUTION:** When servicing the notebook, ensure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the notebook.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Ensure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

5.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. To prevent damage to the notebook, damage to a removable drive, or loss of information, observe the following precautions:

■ Before removing or inserting a hard drive, shut down the notebook. If you are unsure whether the notebook is off or in hibernation, turn the notebook on, and then shut it down through the operating system.

■ Before removing a diskette drive or optical drive, ensure that a diskette or disc is not in the drive and ensure that the optical drive tray is closed.

■ Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

■ Handle drives on surfaces covered with at least one inch of shock-proof foam.

■ Avoid dropping drives from any height onto any surface.

■ After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

■ Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.

■ Avoid exposing a drive to temperature extremes or liquids.

■ If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package "FRAGILE: Handle With Care."

5.4 **Preventing Electrostatic Damage**

Many electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

A sudden discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs.

An electronic device exposed to electrostatic discharge may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

5.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

■ To avoid hand contact, transport products in static-safe containers, such as tubes, bags, or boxes.

■ Protect all electrostatic-sensitive parts and assemblies with conductive or approved containers or packaging.

■ Keep electrostatic-sensitive parts in their containers until the parts arrive at static-free workstations.

■ Place items on a grounded surface before removing items from their containers.

■ Always be properly grounded when touching a sensitive component or assembly.

■ Store reusable electrostatic-sensitive parts from assemblies in protective packaging or nonconductive foam.

■ Use transporters and conveyors made of antistatic belts and roller bushings. Ensure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.y

5.6 **Workstation Precautions**

Use the following grounding precautions at workstations:

■ Cover the workstation with approved static-shielding material (refer to Table 5-2, "Static-Shielding Materials").

■ Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.

■ Use conductive field service tools such as cutters, drivers, and vacuums.

■ When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.

■ Keep the work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.

■ Handle electrostatic-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.

■ Avoid contact with pins, leads, or circuitry.

■ Turn off power and input signals before inserting or removing connectors or test equipment.

5.7 Grounding Equipment and Methods

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

■ When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.

■ When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

Other grounding equipment recommended for use in preventing electrostatic damage includes:

■ Antistatic tape

■ Antistatic smocks, aprons, and sleeve protectors

■ Conductive bins and other assembly or soldering aids

■ Nonconductive foam

■ Conductive tabletop workstations with ground cords of one megohm resistance

■ Static-dissipative tables or floor mats with hard ties to the ground

■ Field service kits

■ Static awareness labels

■ Material-handling packages

■ Nonconductive plastic bags, tubes, or boxes

■ Metal tote boxes

■ Electrostatic voltage levels and protective materials

Table 5-1 shows how humidity affects the electrostatic voltage levels generated by different activities.

Table 5-1

Typical Electrostatic Voltage Levels

Event	Relative Humidity		
	10%	40%	55%
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

✎ A product can be degraded by as little as 700 V.

Table 5-2 lists the shielding protection provided by antistatic bags and floor mats.

Table 5-2

Static-Shielding Materials

Material	Use	Voltage Protection Level
Antistatic plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

6

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

There are 56 screws, in 10 different sizes, that may have to be removed, replaced, or loosened when servicing the notebook. Make special note of each screw and screw lock size and location during removal and replacement.

Refer to Appendix C, "Screw Listing," for detailed information on screw and screw lock sizes, locations, and usage.

6.1 Serial Number

Report the notebook serial number to HP when requesting information or ordering spare parts. The serial number is located on the bottom of the notebook.
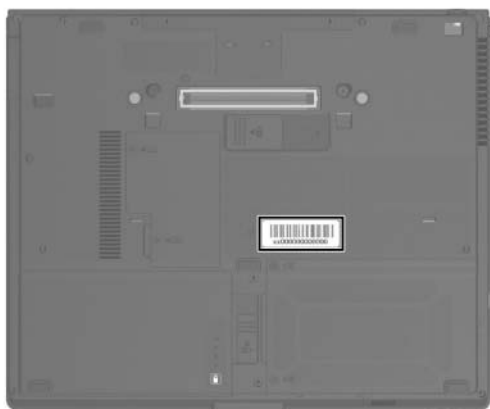
Serial Number Location

6.2 Disassembly Sequence Chart

Use the chart below to determine the section number to be referenced when removing notebook components.

<table>
<tr><th colspan="3">Disassembly Sequence Chart</th></tr>
<tr><th>Section</th><th>Description</th><th># of Screws Removed</th></tr>
<tr><td>6.3</td><td>Preparing the notebook for disassembly
   Battery pack</td><td>

0</td></tr>
<tr><td>6.4</td><td>Hard drive</td><td>2 loosened to remove the hard drive cover
1 loosened to remove the hard drive
4 to disassemble the hard drive</td></tr>
<tr><td>6.5</td><td>Notebook feet</td><td>0</td></tr>
<tr><td>6.6</td><td>Bluetooth module</td><td>2 loosened to remove the Bluetooth cover</td></tr>
<tr><td>6.7</td><td>External memory module</td><td>2 to remove the memory module compartment cover</td></tr>
<tr><td>6.8</td><td>TPM security card</td><td>1</td></tr>
<tr><td>6.9</td><td>Keyboard cover</td><td>2</td></tr>
<tr><td>6.10</td><td>Keyboard</td><td>4</td></tr>
<tr><td>6.11</td><td>Fan</td><td>3</td></tr>
<tr><td>6.12</td><td>Heat sink</td><td>4</td></tr>
</table>

Disassembly Sequence Chart *(Continued)*

Section	Description	# of Screws Removed
6.13	Processor	1 loosened
6.14	Internal memory module	0
6.15	Mini PCI communications card	0
	⚠ To prevent an unresponsive system and the display of a warning message, install only a Mini PCI device authorized for use in your notebook by the governmental agency that regulates wireless devices in your country. If you install a device and then receive a warning message, remove the device to restore notebook functionality. Then contact Customer Care.	
6.16	Display assembly	6
6.17	Button board	2 on rear keyboard cover 1 on button board
6.18	Top cover	8
6.19	TouchPad	4
6.20	Speaker	2
6.21	Infrared board	1
6.22	System board	5
6.23	Modem board	2
6.24	RTC battery	0

6.3 Preparing the Notebook for Disassembly

Before you begin any removal or installation procedures:

1. Shut down the notebook. If you are unsure whether the notebook is off or in hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the notebook.

3. Disconnect the power cord.

Battery Pack Spare Part Number Information	
6-cell battery pack	383510-001

4. Remove the battery pack by following these steps:

   c. Turn the notebook upside down with the rear panel toward you.

   d. Slide the battery release latch ❶ toward you. (The left side of the battery pack disengages from the notebook.)

   e. Lift the left side of the battery pack and swing it to the right ❷ to remove it.
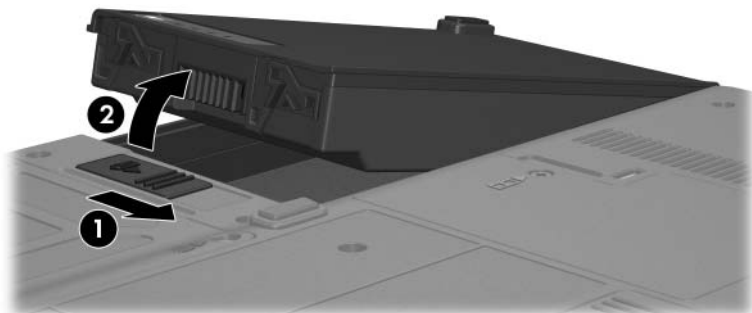
Removing the Battery Pack

Reverse the above procedure to install the battery pack.

6.4 **Hard Drive**

Hard Drive Spare Part Number Information

Hard drives (all 5400 rpm; include cover, frame, and connector)

80-GB	383527-001
60-GB	383526-001
40-GB	383525-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the two PM2.0×5.0 screws ❶ that secure the hard drive cover to the notebook.

3. Lift the right side of the hard drive cover and swing it to the left ❷ to remove it.

✎ The hard drive cover is included in the Miscellaneous Plastics/Hardware Kit, spare part number 383549-001.
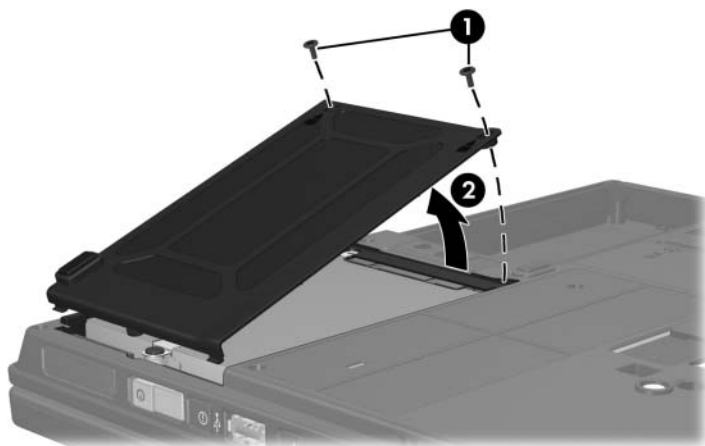
Removing the Hard Drive Cover

4. Loosen the PM2.5×13.0 hard drive retention screw ❶.

5. Grasp the mylar tab ❷ on the hard drive and slide the hard drive to the left ❸ to disconnect it from the system board.

6. Remove the hard drive ❹.
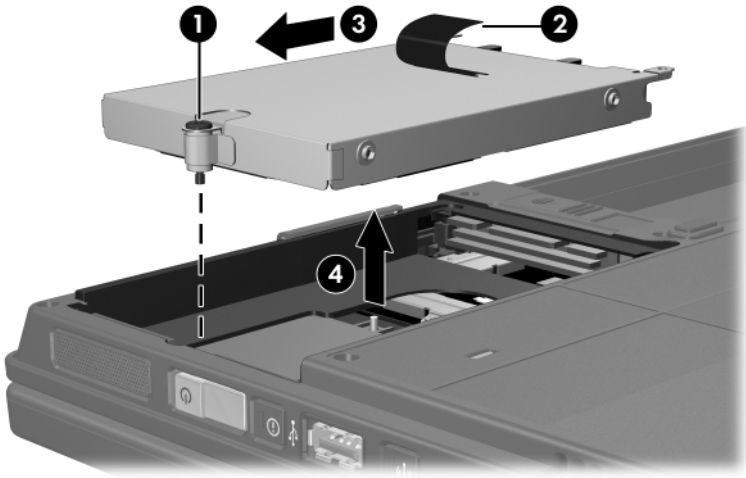
Removing the Hard Drive

7. Remove the four PM3.0×4.0 screws ❶ that secure the hard drive frame to the hard drive.

8. Lift the frame straight up ❷ to remove if from the hard drive.

9. Remove the hard drive connector ❸.
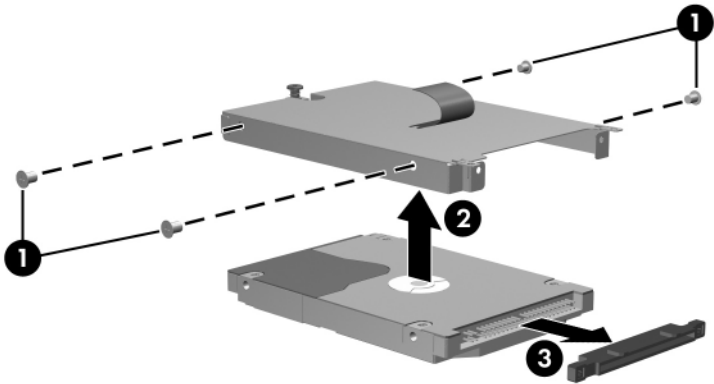
Removing the Hard Drive Frame

Reverse the above procedure to reassemble and install the hard drive.

6.5 Notebook Feet

The notebook feet are adhesive-backed rubber pads. The feet are included in the Miscellaneous Plastics/Hardware Kit, spare part number 383549-001.
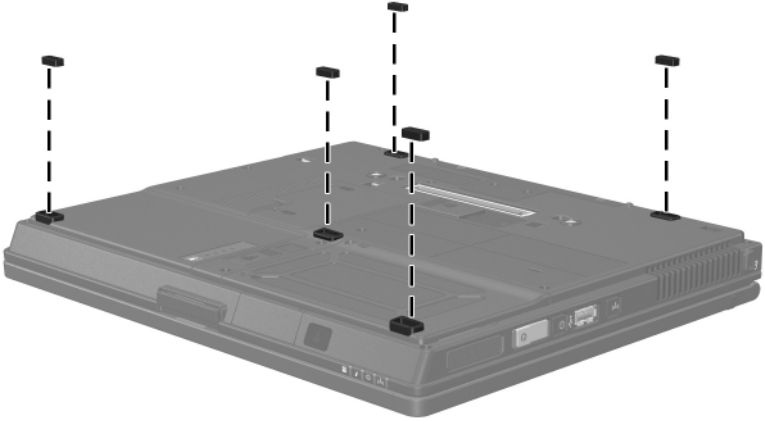
Replacing the Notebook Feet

6.6 Bluetooth Module

Bluetooth Module Spare Part Number Information

Bluetooth wireless module (includes Bluetooth module cable)   370429-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the hard drive (Section 6.4).

3. Position the notebook with the front toward you.

4. Loosen the two PM2.0×5.0 screws ❶ that secure the Bluetooth cover to the notebook.

5. Remove the Bluetooth cover ❷.

✎ The Bluetooth cover is included in the Miscellaneous Plastics/Hardware Kit, spare part number 383549-001.
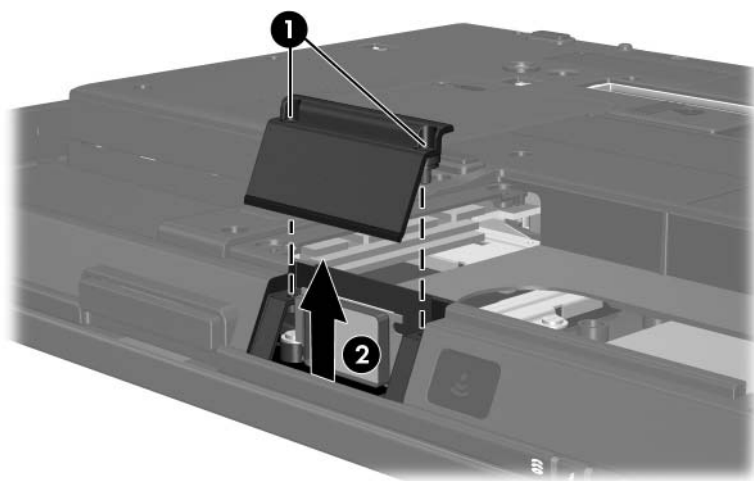
Removing the Bluetooth Cover

6. Slide the Bluetooth module out of the notebook ❶.

7. Disconnect the Bluetooth module cable ❷ from the board.
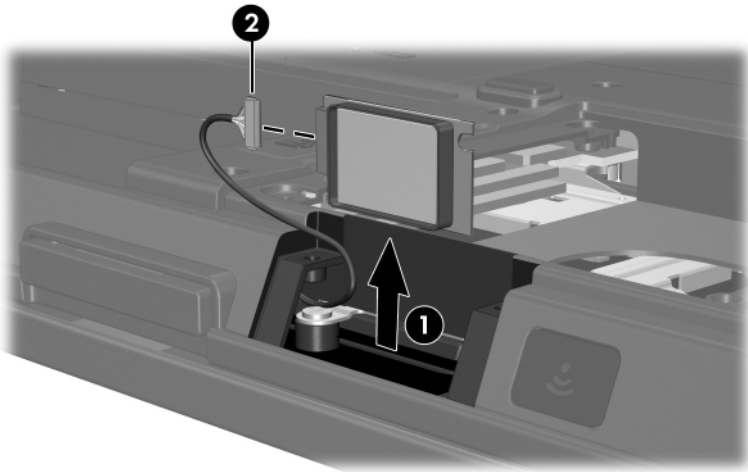
Removing the Bluetooth Module

Reverse the above procedure to install the Bluetooth module.

6.7 External Memory Module

Memory Module Spare Part Number Information	
PC24200	
1024 MB	383536-001
512 MB	383542-001
256 MB	383538-001
PC23200	
1024 MB	383535-001
512 MB	383541-001
256 MB	383537-001

1. Prepare the notebook for disassembly (refer to Section 6.3).

2. Position the notebook with the front toward you.

3. Remove the two PM2.0×5.0 screws ❶ that secure the memory module compartment cover to the notebook.

4. Lift the left side of the cover and swing it to the right ❷ to remove the memory module compartment cover.

✎ The memory module compartment cover is included in the Miscellaneous Plastics/Hardware Kit, spare part number 383549-001.
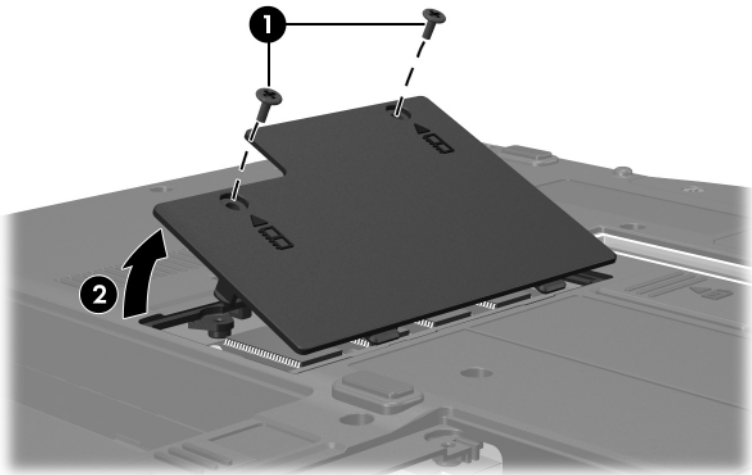
Removing the Memory Module Compartment Cover

5. Spread the retaining tabs ❶ on each side of the memory module socket to release the memory module. (The side of the module opposite the socket rises away from the notebook.)

6. Slide the module away from the socket at an angle ❷.

7. Remove the memory module.

✎ Memory modules are slotted ❸ to prevent incorrect installation into the memory module socket.
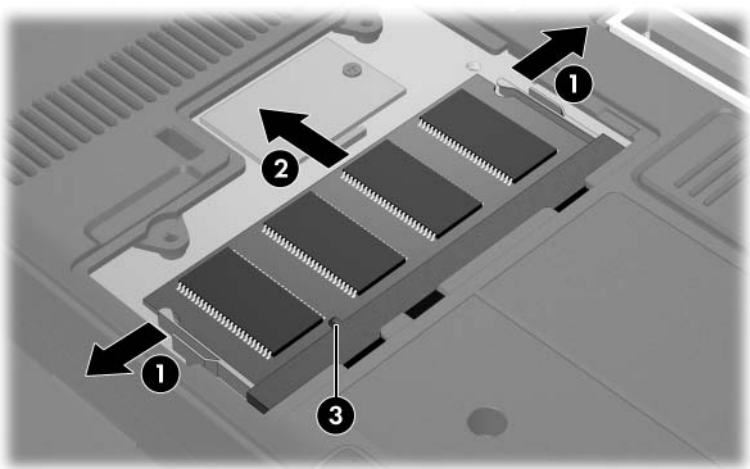
Removing the Memory Module

Reverse the above procedure to install an external memory module.

6.8 TPM Security Card

TPM Security Card Spare Part Number Information

TPM security module	383545-001

1. Prepare the notebook for disassembly (Section 6.3).
2. Remove the memory module compartment cover (Section 6.7).
3. Remove the PM1.5×3.5 screw ❶ that secures the TPM security card to the notebook.
4. Lift up on the rear edge of the TPM security card ❷ to disconnect it from the system board.
5. Remove the TPM security card.
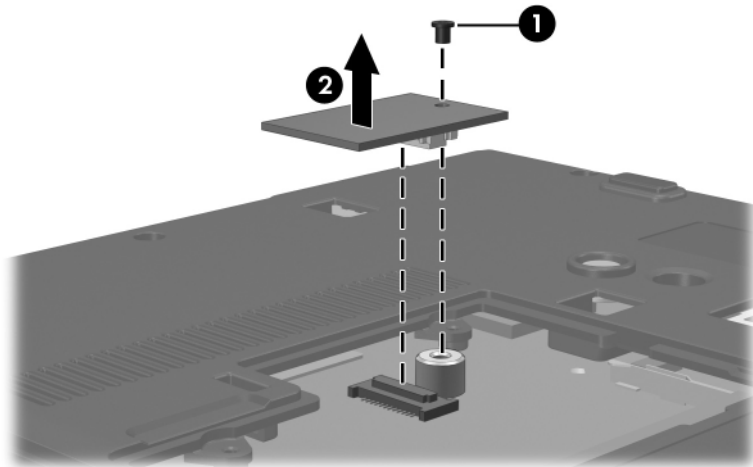
Removing a TPM Security Card

Reverse the above procedure to install the TPM security card.

6.9 **Keyboard Cover**

Keyboard Cover Spare Part Number Information

Keyboard cover	383519-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Position the notebook with the front toward you.

3. Remove the two T8M2.0×18.0 screws that secure the keyboard cover to the notebook.
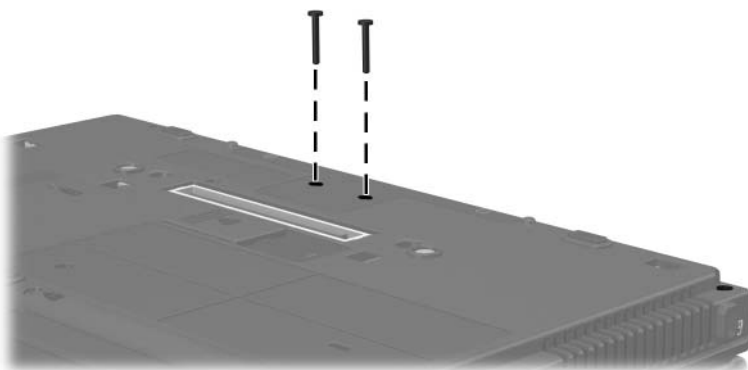
Removing the Keyboard Cover Screws

4. Turn the notebook right-side up with the front toward you.

5. Open the notebook as far as possible.

6. Lift the front edge of the keyboard cover until it detaches from the notebook.

Releasing the Keyboard Cover

7. Lift the keyboard cover straight up and remove it.

Removing the Keyboard Cover

Reverse the above procedure to install the keyboard cover.

6.10 Keyboard

Keyboard Spare Part Number Information

Keyboards, with pointing stick

Asia Pacific	383458-371	The Netherlands	383458-331
Australia	383458-011	Norway	383458-091
Belgium	383458-181	People's Republic of China	383458-AA1
Czech Republic	383458-221		
Denmark	383458-081	Poland	383458-241
Europe	383458-021	Portugal	383458-131
France	383458-051	Russia	383458-251
French Canada	383458-121	Saudi Arabia	383458-171
Germany	383458-041	Spain	383458-071
Hong Kong	383458-AC1	Slovakia	383458-231
Hungary	383458-211	Sweden	383458-101
Iceland	383458-DD1	Switzerland	383458-111
Israel	383458-BB1	Taiwan	383458-AB1
Italy	383458-061	Thailand	383458-281
Japan	383458-291	Turkey	383458-141
Korea	383458-AD1	United Kingdom	383458-031
Latin America	383458-161	United States	383458-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard cover (Section 6.9).

3. Turn the notebook upside down with the front toward you.

4. Remove the following:

   ❶ Three T8M2.0×9.0 screws

   ❷ One T8M2.0×5.0 screw
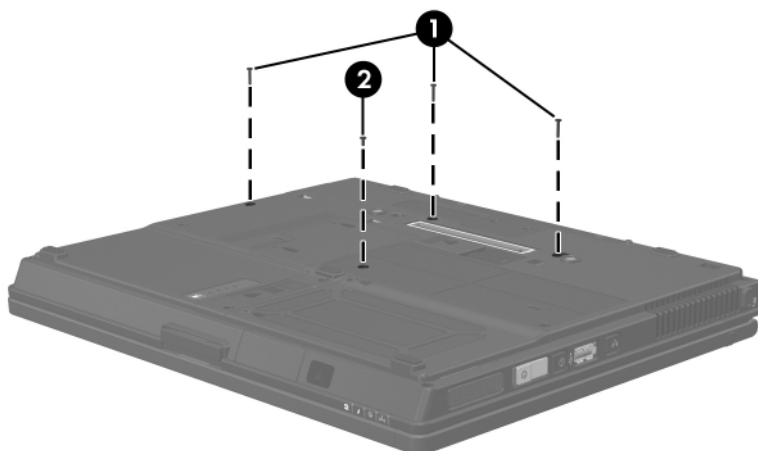
Removing the Keyboard Screws

5. Turn the notebook right-side up with the front toward you.

6. Open the notebook as far as possible.

7. Slide the keyboard back ❶ until the pointing stick cable is accessible.

8. Release the zero insertion force (ZIF) connector to which the pointing stick cable is connected and disconnect the pointing stick cable ❷ from the system board.
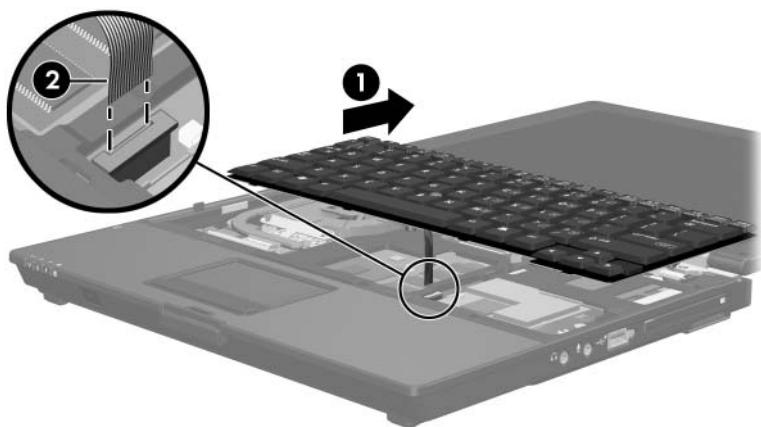
Disconnecting the Pointing Stick Cable

9. Lift the rear edge of the keyboard ❶ until it disengages from the notebook.

10. Slide the keyboard forward ❷ until it rests on the palm rest.

11. Release the ZIF connector to which the keyboard cable is connected and disconnect the keyboard cable ❸ from the system board.

12. Remove the keyboard.
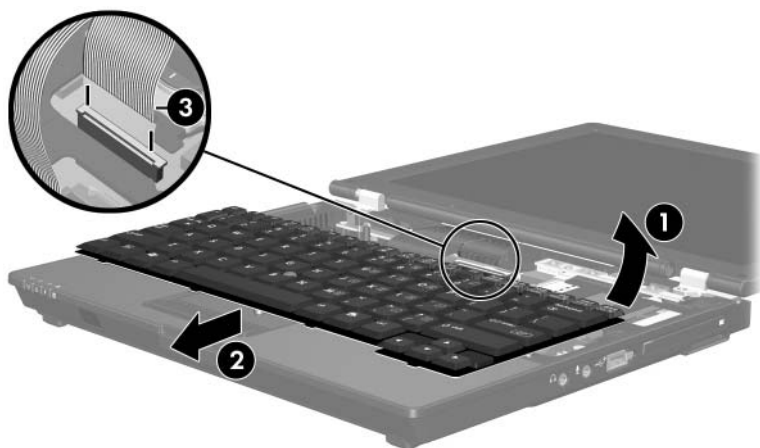
Removing the Keyboard

Reverse the above procedure to install the keyboard.

6.11 Fan

Fan Spare Part Number Information

Fan   383528-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard cover (Section 6.9).

3. Release the keyboard (Section 6.10).

4. Disconnect the fan cable ❶ from the system board.

5. Remove the three T8M2.0×7.5 screws ❷ that secure the fan to the notebook.

6. Remove the fan ❸.
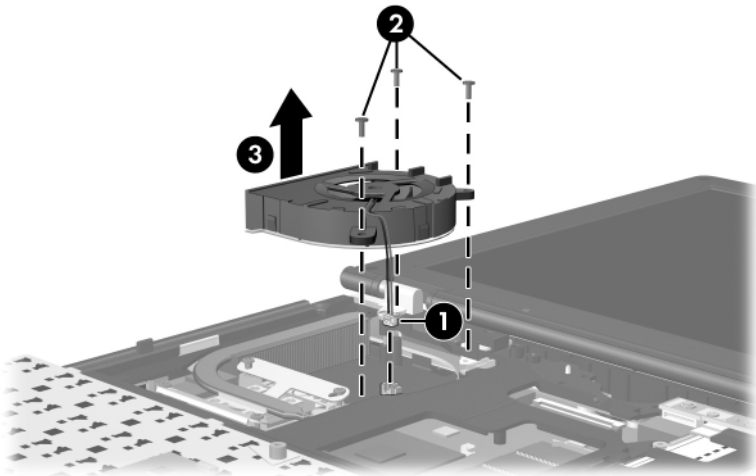
Removing the Fan

Reverse the above procedure to install the fan.

6.12   Heat Sink

Heat Sink Spare Part Number Information

Heat sink (includes thermal paste)	383559-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard cover (Section 6.9).

3. Release the keyboard (Section 6.10).

4. Remove the fan (Section 6.11).

5. Remove the four PM2.5×7.0 screws that secure the heat sink to the notebook.
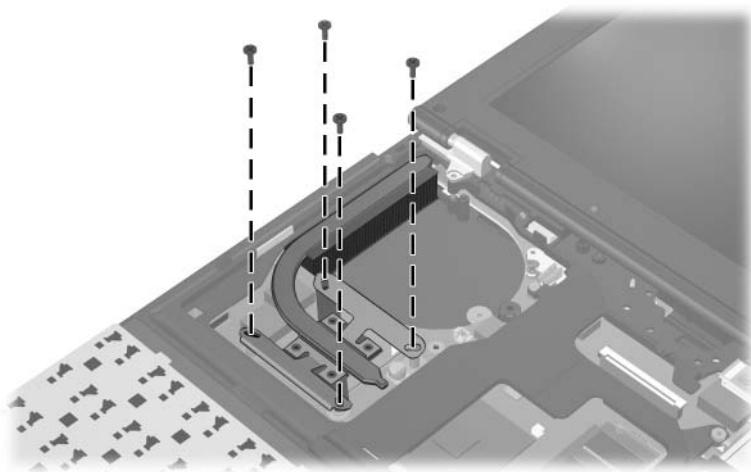
Removing the Heat Sink Screws

6. Lift the right side of the heat sink ❶ to disengage it from the processor.

7. Slide the heat sink up and to the right ❷ to remove it.

✎ Due to the adhesive quality of the thermal paste located between the heat sink and processor, it may be necessary to move the heat sink from side to side to detach the heat sink from the processor.
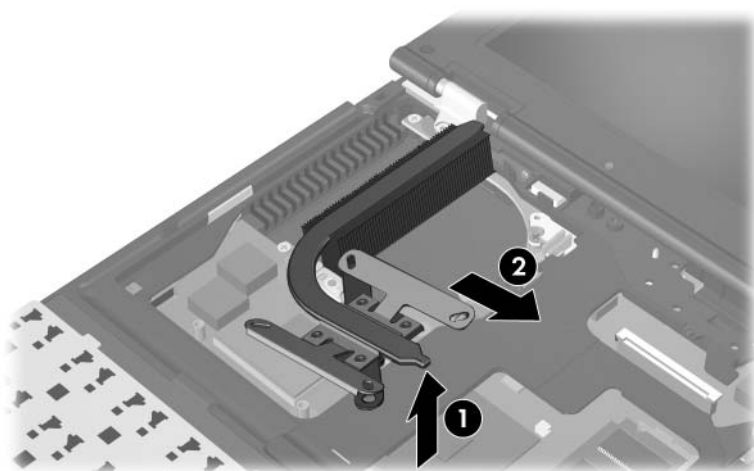
Removing the Heat Sink

✎ The thermal paste should be thoroughly cleaned from the surfaces of the heat sink ❶ and processor ❷ each time the heat sink is removed. Thermal paste is included with all heat sink and processor spare part kits.
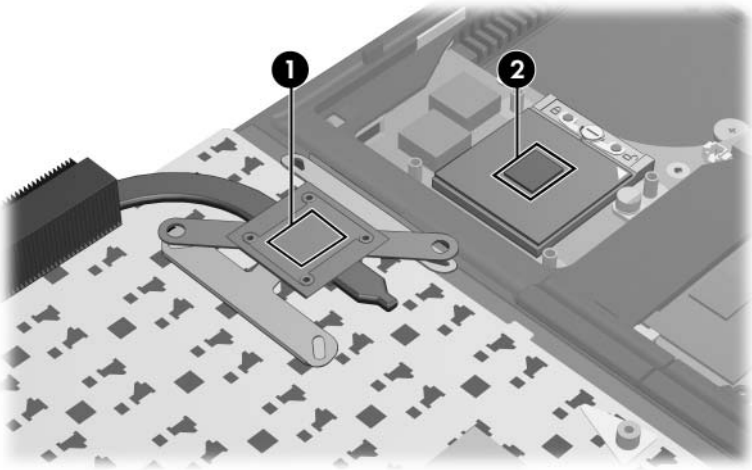
Thermal Paste Locations

Reverse the above procedure to install the heat sink.

6.13 **Processor**

✎ All processor spare part kits include thermal paste.

Processor Spare Part Number Information

Intel Pentium M 2.13-GHz	383555-001
Intel Pentium M 2.00-GHz	383554-001
Intel Pentium M 1.86-GHz	383553-001
Intel Pentium M 1.73-GHz	383552-001
Intel Pentium M 1.60-GHz	383551-001
Intel Celeron M 1.50-GHz	384144-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard cover (Section 6.9).

3. Release the keyboard (Section 6.10).

4. Remove the fan (Section 6.11).

5. Remove the heat sink (Section 6.12).

6. Use a flat-blade screwdriver to turn the processor locking screw one-quarter turn counterclockwise ❶ until you hear a click.

7. Lift the processor straight up and remove it ❷.

✎ The gold triangle ❸ on the processor should be aligned in the rear right corner when you install the processor.
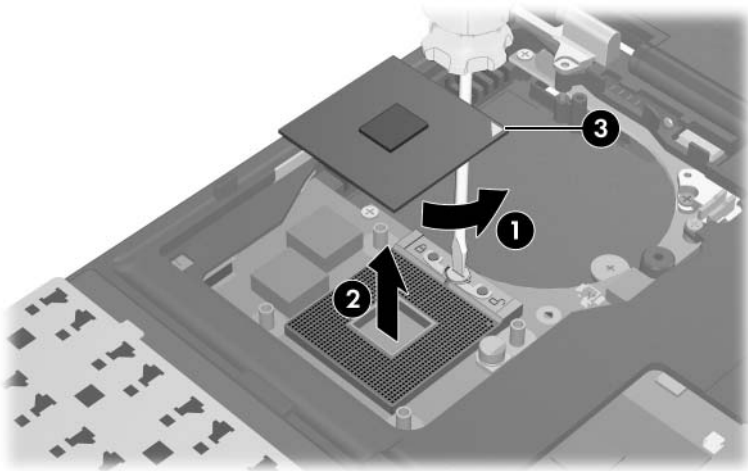
Removing the Processor

Reverse the above procedure to install the processor.

6.14 Internal Memory Module

Memory Module Spare Part Number Information

PC24200	
1024 MB	383536-001
512 MB	383542-001
256 MB	383538-001
PC23200	
1024 MB	383535-001
512 MB	383541-001
256 MB	383537-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard cover (Section 6.9).

3. Release the keyboard (Section 6.10).

4. Spread the retaining tabs ❶ on each side of the memory module socket to release the memory module. (The side of the memory module opposite the socket rises away from the notebook.)

5. Slide the memory module away from the socket at an angle ❷.

6. Remove the memory module.

✎ Memory modules are slotted ❸ to prevent incorrect installation into the memory module socket.
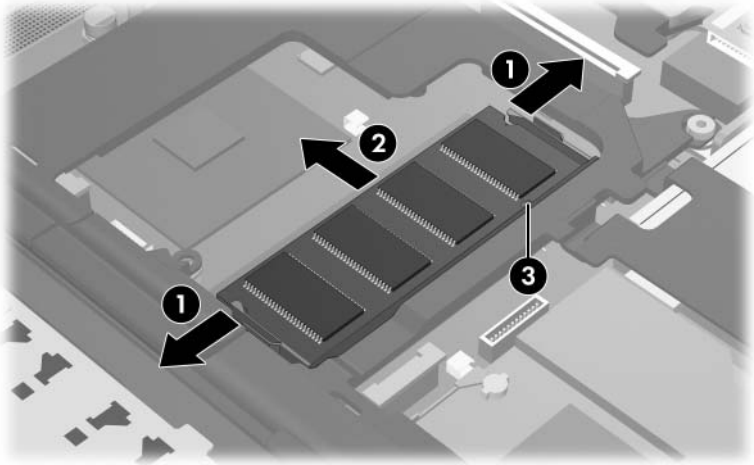
Removing the Internal Memory Module

Reverse the above procedure to install a memory module.

6.15 Mini PCI Communications Card

Mini PCI Communications Card Spare Part Number Information	
802.11b/g Silverton wireless local access network (WLAN) card, for use in most of the world	359106-001
802.11b/g Silverton WLAN card, for use in the rest of the world	359107-001
802.11a/b/g FRLN WLAN card, for use in Europe	377792-001
802.11a/b/g FRLN WLAN card, for use in Japan	373888-291
802.11a/b/g FRLN WLAN card, for use in most of the world	373888-001
802.11a/b/g FRLN WLAN card, for use in the rest of the world	373889-001
802.11a/b/g DynaStar WLAN card, for use in Japan	337407-291
802.11a/b/g DynaStar WLAN card, for use in most of the world	337407-001
802.11a/b/g DynaStar WLAN card, for use in the rest of the world	337407-002
802.11a/b/g ATMC WLAN card, for use in Japan	377408-291
802.11a/b/g ATMC WLAN card, for use in most of the world	377408-001
802.11a/b/g ATMC WLAN card, for use in the rest of the world	377408-002

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard cover (Section 6.9).

3. Release the keyboard (Section 6.10).

✎ Make note of which antenna cable is attached to which antenna clip on the Mini PCI communications card before disconnecting the cables.

4. Disconnect the auxiliary and main antenna cables ❶ from the Mini PCI communications card.

5. Spread the two retaining tabs ❷ on each side of the Mini PCI socket to release the Mini PCI communications card. (The edge of the card opposite the socket rises away from the notebook.)

6. Remove the Mini PCI communications card by pulling the card away from the socket at a 45-degree angle ❸.

✎ The Mini PCI communications card is slotted ❹ to prevent incorrect installation.
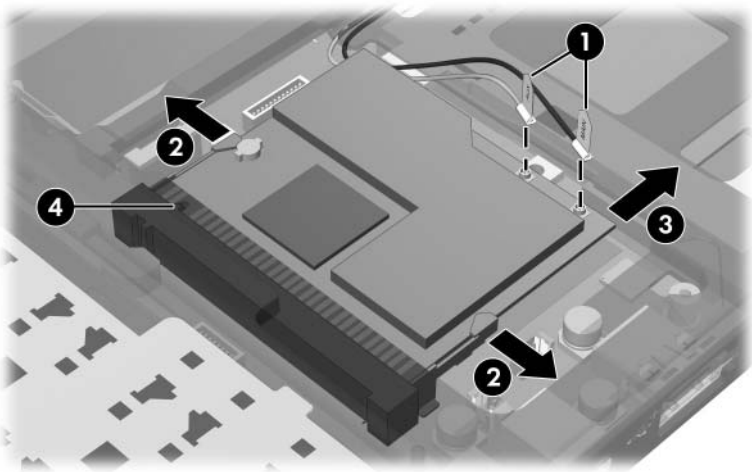
Removing a Mini PCI Communications Card

Reverse the above procedure to install a Mini PCI communications card.

6.16 Display Assembly

Display Assembly Spare Part Number Information

12.1-inch, XGA, TFT display assembly (includes wireless antenna boards and cables)	383547-001
Display Hinge Kit	383530-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard cover (Section 6.9).

3. Remove the keyboard (Section 6.10).

4. Close the notebook.

5. Turn the notebook upside down with the rear panel toward you.

6. Remove the two T8M2.0×18.0 screws ❶ that secure the display cable cover to the notebook.

7. Remove the two T8M2.0×9.0 screws ❷ that secure the display assembly to the notebook.
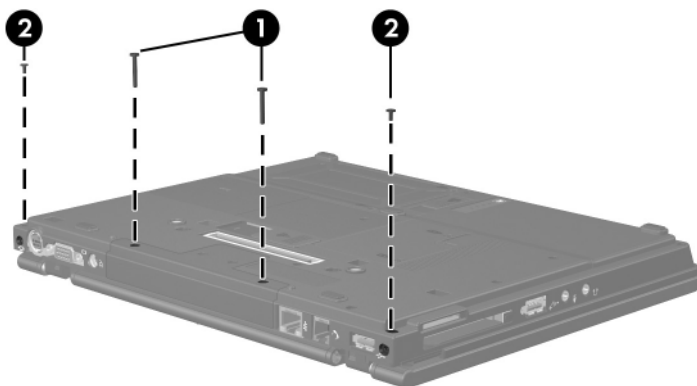
Removing the Display Assembly Screws

8. Remove the base enclosure cover.
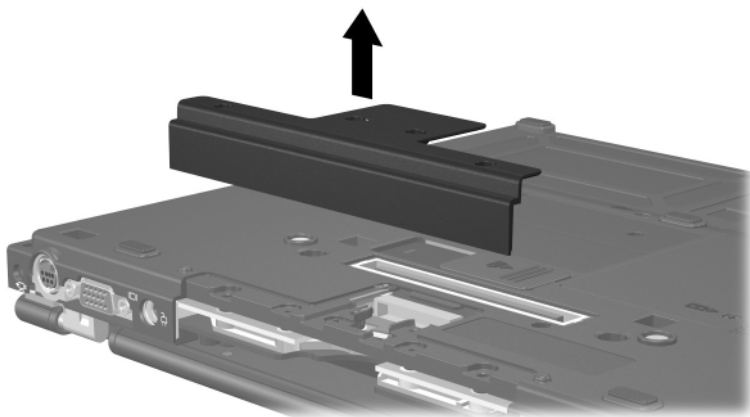
Removing the Base Enclosure Cover

9. Disconnect the display cable from the system board.
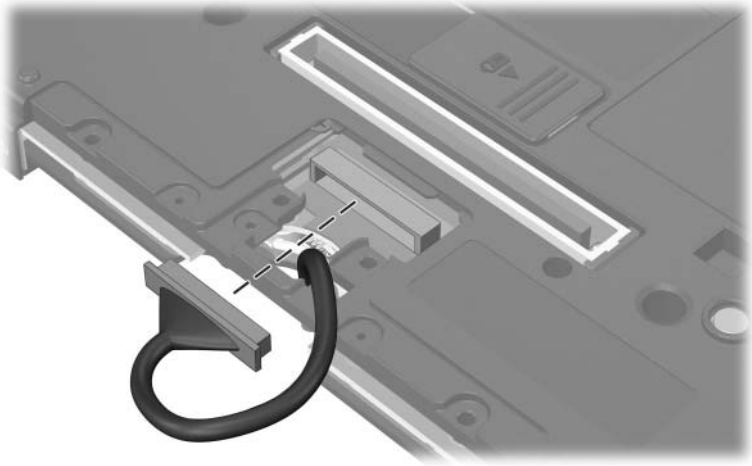
Disconnecting the Display Cable

10. Route the display cable through the opening between the base enclosure and the top cover.
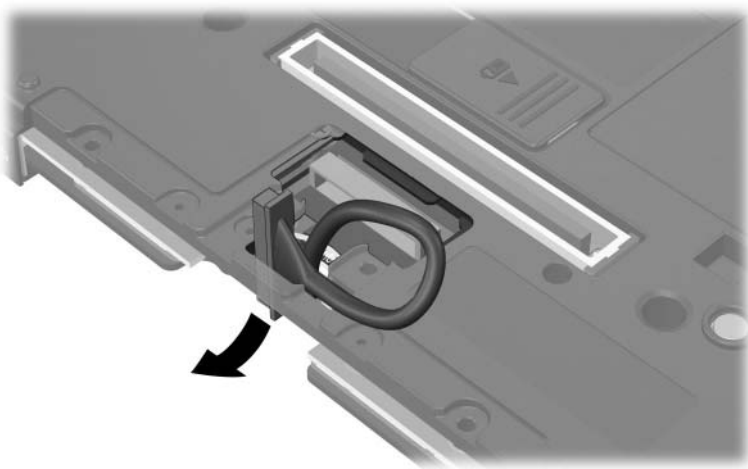
Releasing the Display Cable

11. Turn the notebook right-side up with the front toward you.

12. Open the notebook as far as possible.

13. Disconnect the wireless antenna cables from the Mini PCI communications card ❶.

14. Disconnect the microphone cable ❷ from the system board.

15. Remove the wireless antenna cables and the microphone cable from the routing channel ❸ and clips ❹ through which the cables are routed.
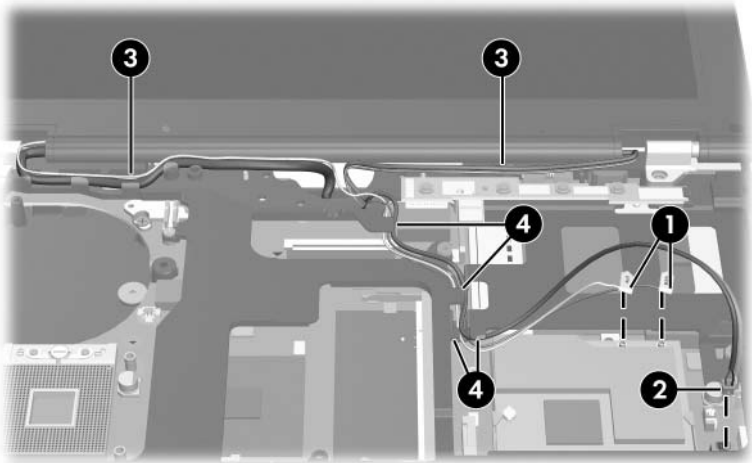
Disconnecting the Display Cables

16. Route the display cable through the opening in the notebook ❶.
17. Remove the two PM2.0×18.0 screws ❷ that secure the display assembly to the notebook.
18. Remove the display assembly ❸.
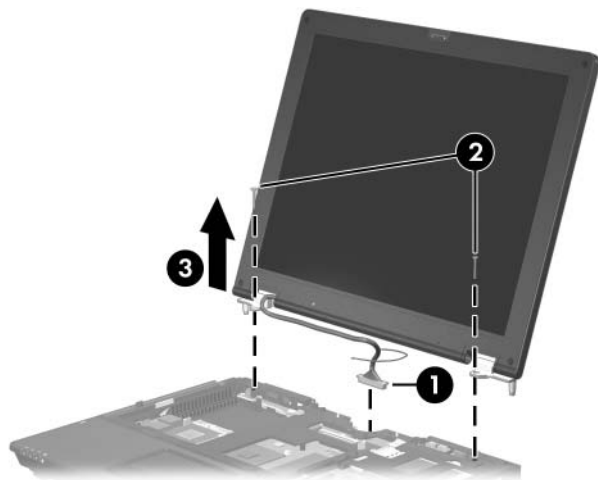
Removing the Display Assembly

Reverse the above procedure to install the display assembly.

6.17   Button Board

Button Board Spare Part Number Information

Rear keyboard cover	383522-001
Button board (includes button board cable)	383511-001

1. Prepare the notebook for disassembly (Section 6.3) and remove the following components:

   a. Keyboard cover (Section 6.9)

   b. Keyboard (Section 6.10)

   c. Display assembly (Section 6.16)

2. Remove the two T8M2.0×18.0 screws ❶ that secure the rear keyboard cover to the notebook.

3. Remove the rear keyboard cover ❷.
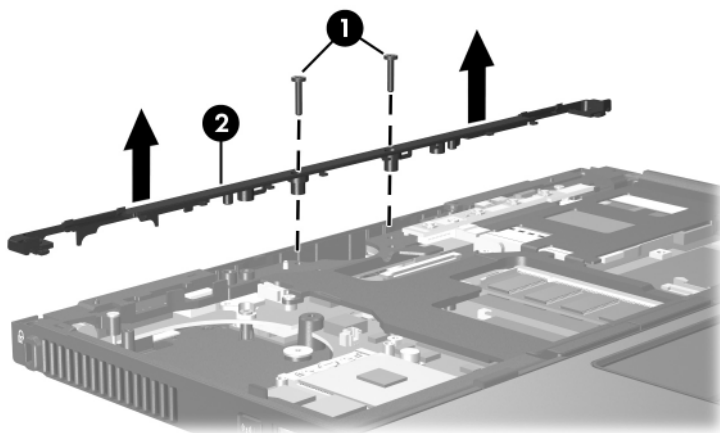
Removing the Rear Keyboard Cover

4. Disconnect the button board cable ❶ from the system board.

5. Remove the silver PM2.0×4.0 screw ❷ that secures the button board to the top cover.
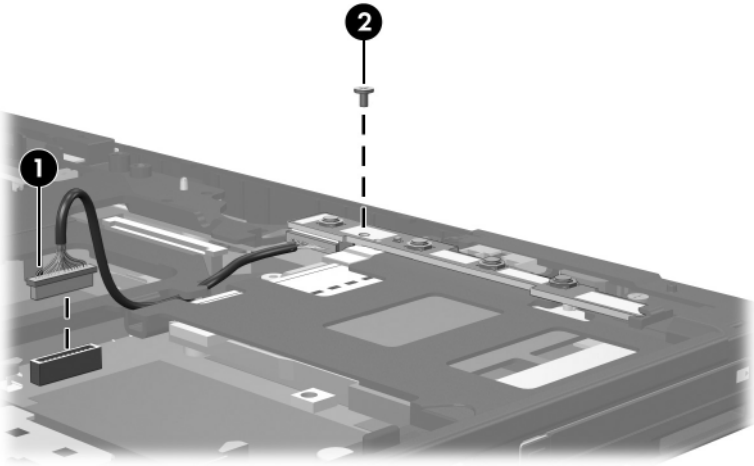
Removing the Button Board Screw

6. Lift the left side of the button board ❶.

7. Slide the button board to the left ❷ and remove it.
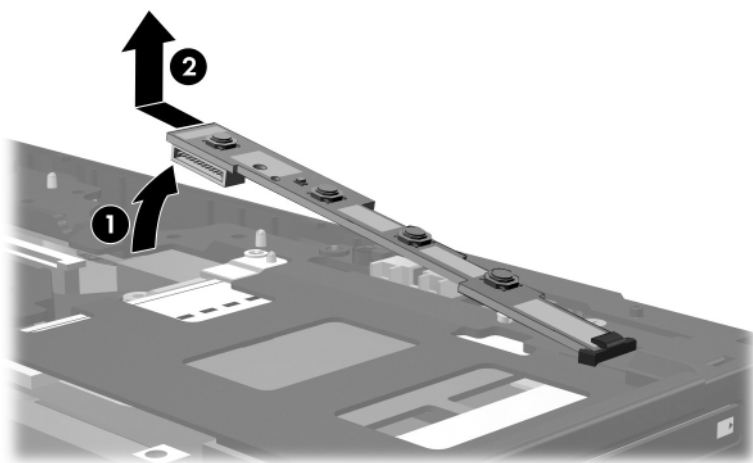
Removing the Button Board

Reverse the above procedure to install the button board.

6.18 Top Cover

Top Cover Spare Part Number Information

Top cover	383560-001

1. Prepare the notebook for disassembly (Section 6.3) and remove the following components:

    a. Hard drive (Section 6.4)

    b. Keyboard cover (Section 6.9)

    c. Keyboard (Section 6.10)

    d. Display assembly (Section 6.16)

    e. Button board (Section 6.17)

2. Turn the notebook upside down with the front toward you.

3. Remove the seven T8M2.0×9.0 screws that secure the top cover to the notebook.
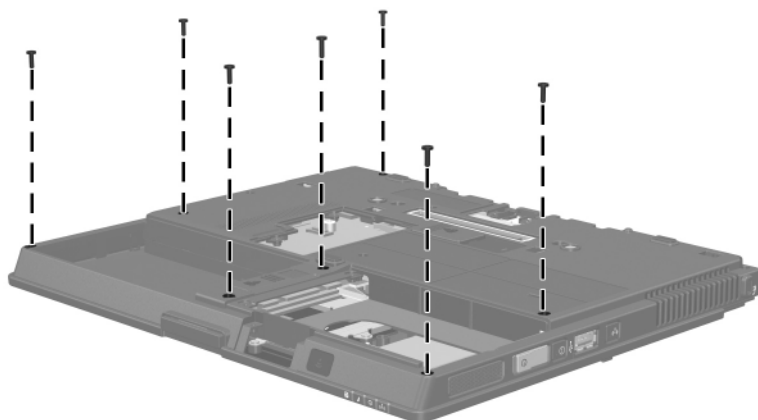
Removing the Top Cover Screws, Part 1

4. Turn the notebook right-side up with the front toward you.

5. Remove the silver PM2.0×4.0 screw that secures the top cover to the notebook.
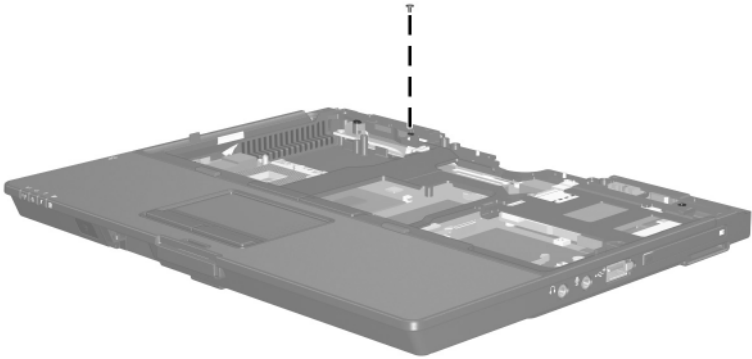
Removing the Top Cover Screw, Part 2

6. Disconnect the TouchPad cable from the system board ❶.

7. Lift the rear edge of the top cover ❷ until it disengages from the base enclosure.

8. Lift the top cover straight up ❸ and remove it.
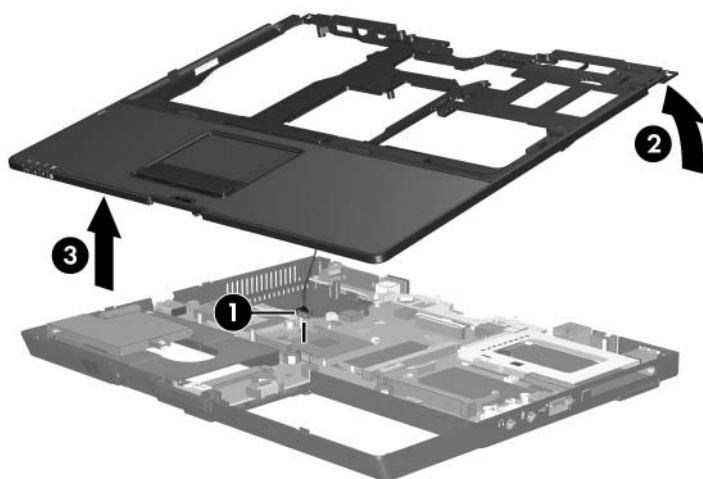
Removing the Top Cover

Reverse the above procedure to install the top cover.

6.19 TouchPad

TouchPad Spare Part Number Information

TouchPad (includes cable and bracket)   383562-001

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    1. Prepare the notebook for disassembly (Section 6.3)
       and remove the following components:

       a. Hard drive (Section 6.4)

       b. Keyboard cover (Section 6.9)

       c. Keyboard (Section 6.10)

       d. Display assembly (Section 6.16)

       e. Button board (Section 6.17)

       f. Top cover (Section 6.18)

    2. Turn the top cover upside down with the front toward you.

3. Remove the four PM2.0×4.0 screws that secure the TouchPad bracket to the top cover.
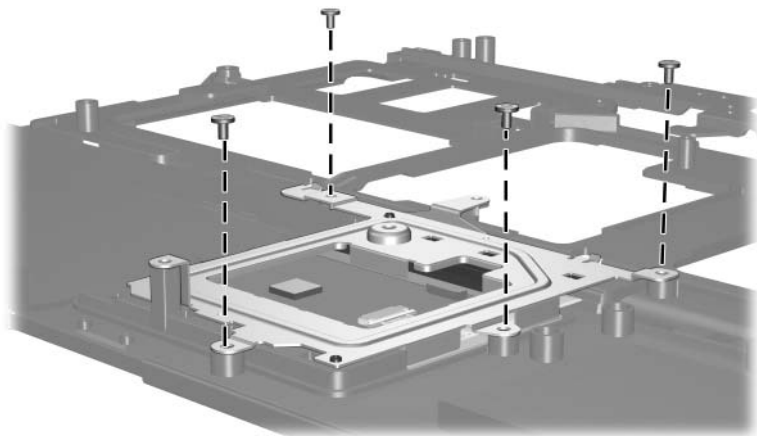
Removing the TouchPad Bracket Screws

4. Lift the right side of the TouchPad bracket ❶ until it rests at an angle.

5. Slide the TouchPad bracket to the right ❷ and remove it.
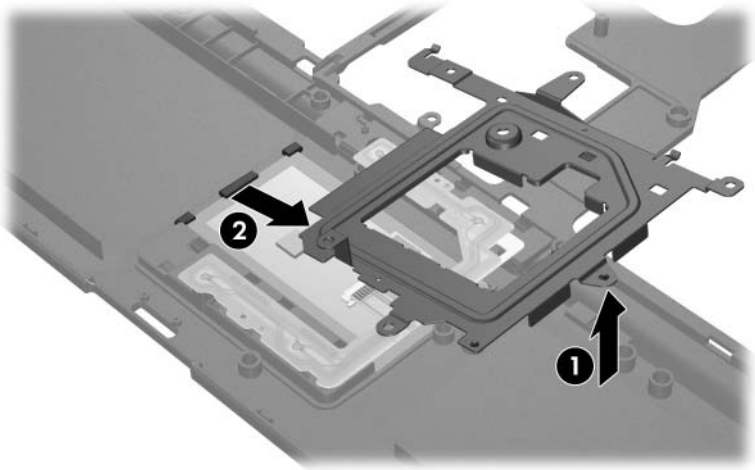
Removing the TouchPad Bracket

6. Lift the right side of the TouchPad ❶ until it rests at an angle.

7. Slide the TouchPad to the right and remove it ❷.
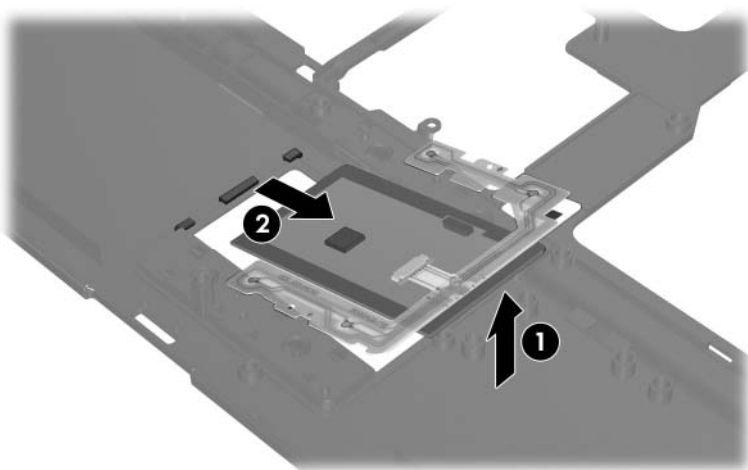
Removing the TouchPad

Reverse the above procedure to install the TouchPad.

6.20 Speaker

Speaker Spare Part Number Information

Speaker	383557-00

1. Prepare the notebook for disassembly (Section 6.3) and remove the following components:

   a. Hard drive (Section 6.4)

   b. Keyboard cover (Section 6.9)

   c. Keyboard (Section 6.10)

   d. Display assembly (Section 6.16)

   e. Button board (Section 6.17)

   f. Top cover (Section 6.18)

2. Disconnect the speaker cable ❶ from the system board and route the cable under the infrared board cable ❷.

3. Remove the two T8M2.0×5.0 screws ❸ that secure the speaker to the notebook.

4. Remove the speaker ❹.
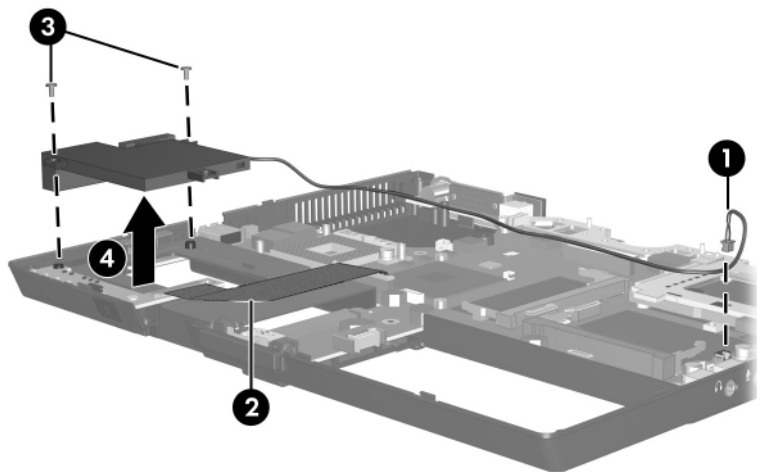
Removing the Speaker

Reverse the above procedure to install the speaker.

6.21 Infrared Board

Infrared Board Spare Part Number Information

Infrared board (includes cable)	383512-001

1. Prepare the notebook for disassembly (Section 6.3) and remove the following components:

   a. Hard drive (Section 6.4)

   b. Keyboard cover (Section 6.9)

   c. Keyboard (Section 6.10)

   d. Display assembly (Section 6.16)

   e. Button board (Section 6.17)

   f. Top cover (Section 6.18)

   g. Speaker (Section 6.20)

2. Release the ZIF connector to which the infrared board cable is connected and disconnect the cable ❶ from the system board.

3. Remove the T8M2.0×5.0 screw ❷ that secures the infrared board to the system board.

4. Remove the infrared board ❸.
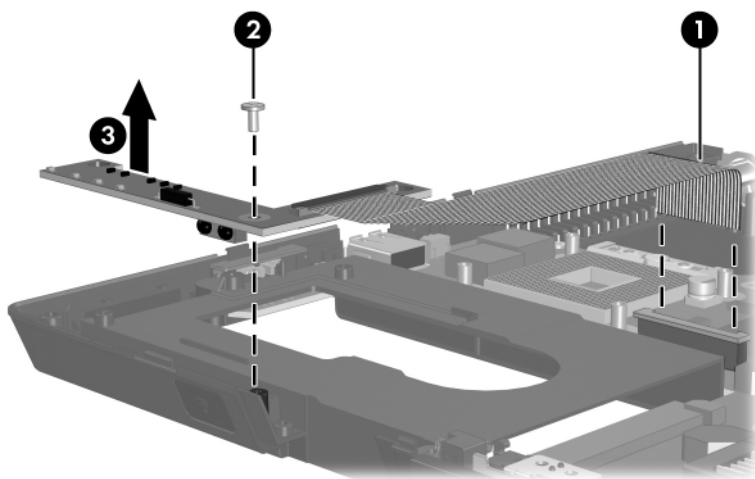
Removing the Infrared Board

Reverse the above procedure to install the infrared board .

6.22 System Board

System Board Spare Part Number Information

System board	383515-001

✎ When replacing the system board, ensure that the following components are removed from the defective system board and installed on the replacement system board:

■ Memory modules (Section 6.7 and Section 6.14)

■ TPM security card (Section 6.8)

■ Processor (Section 6.13)

■ Mini PCI communications card (Section 6.15)

■ Modem board (Section 6.23)

■ RTC battery (Section 6.24)

---

1. Prepare the notebook for disassembly (Section 6.3) and remove the following components:

   a. Hard drive (Section 6.4)

   b. Bluetooth module (Section 6.6)

   c. Keyboard cover (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Fan (Section 6.11)

   f. Heat sink (Section 6.12)

   g. Display assembly (Section 6.16)

   h. Button board (Section 6.17)

   i. Top cover (Section 6.18)

   j. Speaker (Section 6.20)

   k. Infrared board (Section 6.21)

2. Remove the four T8M2.0×5.0 screws ❶ that secure the system board to the notebook.

3. Remove the T8M2.0×7.5 screw ❷ that secures the system board spacer to the notebook.

4. Remove the system board spacer ❸.
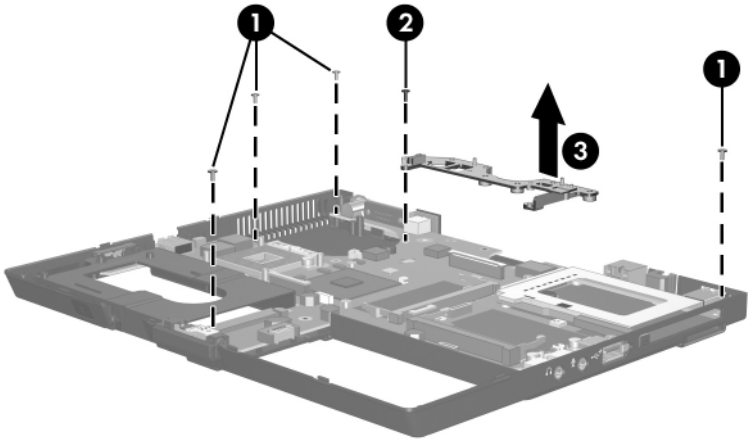
Removing the System Board Screws

5. Lift the left side of the system board ❶ until the hard drive connector ❷ is clear of the base enclosure.

6. Slide the system board to the left ❸ to remove it.
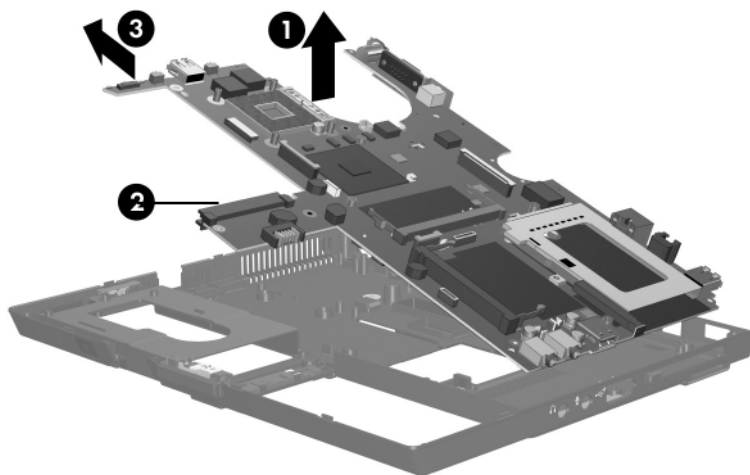
Removing the System Board

Reverse the above procedure to install the system board.

6.23 Modem Board

Modem Board Spare Part Number Information

Modem board (high-speed 56K, includes modem cable)	383534-001

1. Prepare the notebook for disassembly (Section 6.3) and remove the following components:

   a. Hard drive (Section 6.4)

   b. Bluetooth module (Section 6.6)

   c. Keyboard cover (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Fan (Section 6.11)

   f. Heat sink (Section 6.12)

   g. Display assembly (Section 6.16)

   h. Button board (Section 6.17)

   i. Top cover (Section 6.18)

   j. Speaker (Section 6.20)

   k. Infrared board (Section 6.21)

   l. System board (Section 6.22)

2. Turn the system board upside down with the front toward you.

3. Disconnect the modem cable from the two connectors ❶ on the system board.

4. Remove the two PM2.0×4.0 screws ❷ that secure the modem board to the system board.

5. Lift the right side of the modem board ❸ to disconnect it from the system board.

6. Remove the modem board.
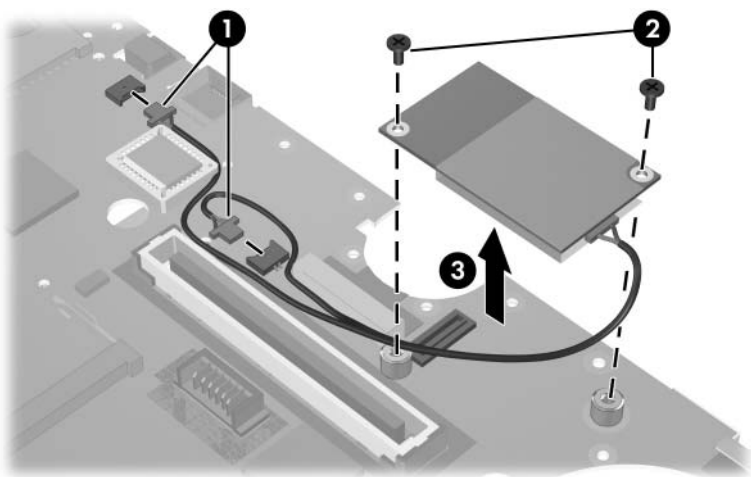
Removing the Modem Board

Reverse the above procedure to install the modem board.

6.24 RTC Battery

RTC Battery Spare Part Number Information

RTC battery	383625-001

1. Prepare the notebook for disassembly (Section 6.3) and remove the following components:

   a. Hard drive (Section 6.4)

   b. Bluetooth module (Section 6.6)

   c. Keyboard cover (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Fan (Section 6.11)

   f. Heat sink (Section 6.12)

   g. Display assembly (Section 6.16)

   h. Button board (Section 6.17)

   i. Top cover (Section 6.18)

   j. Speaker (Section 6.20)

   k. Infrared board (Section 6.21)

   l. System board (Section 6.22)

2. Turn the system board upside down with the left side toward you.

3. Remove the RTC battery from the system board socket.
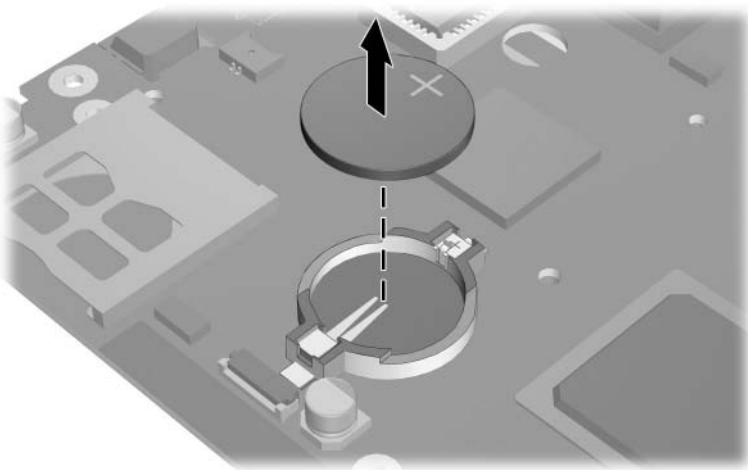
Removing the RTC Battery

Reverse the above procedure to install the RTC battery.

7

Specifications

This chapter provides physical and performance specifications.

Table 7-1

Notebook

Dimensions	Metric	U.S.
Height (front to back)	30.2 to 31.5 mm	1.19 to 1.24 in
Width	285 mm	11.22 in
Depth	235 mm	9 in
Weight	1.81 kg	3.99 lbs
Input Power		
Operating voltage	18.5 V dc @ 3.5 A - 65 W	
Operating current	3.5 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F

Table 7-1

Notebook *(Continued)*

Relative humidity (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 95%	5% to 95%
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random Vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	

✎ Applicable product safety standards specify thermal limits for plastic surfaces. The notebook operates well within this range of temperatures.

Table 7-2

12.1-inch, XGA, TFT Display

Dimensions		
Height	20.7 cm	8.1 in
Width	33.1 cm	13.0 in
Diagonal	39.1 cm	15.4 in
Number of colors	Up to 16.8 million	
Contrast ratio	150:1	
Brightness	150 nits typical	
Pixel resolution		
Pitch	0.300 × 0.300 mm	
Format	1024 × 768	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	3.5 W	
Viewing angle	+/-65° horizontal, +/-50° vertical typical	

Table 7-3

Hard Drives

	80-GB*	60-GB*	40-GB*
Dimensions			
Height	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm
Weight	99 g	102 g	99 g
Interface type	ATA-5	ATA-5	ATA-5
Transfer rate			
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)			
Single track	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms
Logical blocks[†]	156,301,488	117,210,240	78,140,160
Disk rotational speed	5400 rpm	5400 rpm	5400 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)		

✎ Certain restrictions and exclusions apply. Consult Customer Care for details.

*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.
[†]Actual drive specifications may differ slightly.

Table 7-4

Primary 6-cell, Li-Ion Battery Pack

Dimensions		
Height	2.00 cm	0.79 in
Width	9.40 cm	3.70 in
Depth	13.40 cm	5.28 in
Weight	0.34 kg	0.75 lb
Energy		
Voltage	10.8 V	
Amp-hour capacity	4.8 Ah	
Watt-hour capacity	52 Wh	
Temperature		
Operating	5°C to 45°C	41°F to 113°F
Nonoperating	0°C to 60°C	32°F to 140°F

Table 7-5

System DMA

Hardware DMA	System Function
DMA0	Not applicable
DMA1*	Not applicable
DMA2*	Not applicable
DMA3	Not applicable
DMA4	Direct memory access controller
DMA5*	Available for PC Card
DMA6	Not assigned
DMA7	Not assigned
*PC Card controller can use DMA 1, 2, or 5.	

Table 7-6

System Interrupts

Hardware IRQ	System Function
IRQ0	System timer
IRQ1	Standard 101-/102-Key or Microsoft Natural Keyboard
IRQ2	Cascaded
IRQ3	Intel 82801DB/DBM USB2 Enhanced Host Controller—24CD
IRQ4	COM1
IRQ5*	Conexant AC—Link Audio Intel 82801DB/DBM SMBus Controller—24C3 Data Fax Modem with SmartCP
IRQ6	Diskette drive
IRQ7*	Parallel port
IRQ8	System CMOS/real-time clock
IRQ9*	Microsoft ACPI-compliant system
IRQ10*	Intel USB UHCI controller—24C2 Intel 82852/82855 GM/GME Graphic Controller Realtek RTL8139 Family PCI fast Ethernet Controller

Table 7-6

System Interrupts *(Continued)*

IRQ11	Intel USB EHCI controller—24CD
	Intel USB UHCI controller—24C4
	Intel USB UHCI controller—24C7
	Intel Pro/Wireless 2200BG
	TI OHCI 1394 host controller
	TI PCI1410 CardBus controller
IRQ12	Synaptics PS/2 TouchPad
IRQ13	Numeric data processor
IRQ14	Primary IDE channel
IRQ15	Secondary IDE channel

*Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.

✎ PC Cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.

Table 7-7

System I/O Addresses

I/O Address (hex)	System Function (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 "Super I/O" configuration for CPU
040 - 05F	Counter/timer registers
044 - 05F	Unused
060	Keyboard controller
061	Port B
062 - 063	Unused
064	Keyboard controller
065 - 06F	Unused
070 - 071	NMI enable/RTC
072 - 07F	Unused
080 - 08F	DMA page registers
090 - 091	Unused
092	Port A
093 - 09F	Unused
0A0 - 0A1	Interrupt controller no. 2

Table 7-7

System I/O Addresses *(Continued)*

I/O Address (hex)	System Function (shipping configuration)
0A2 - 0BF	Unused
0C0 - 0DF	DMA controller no. 2
0E0 - 0EF	Unused
0F0 - 0F1	Coprocessor busy clear/reset
0F2 - 0FF	Unused
100 - 16F	Unused
170 - 177	Secondary fixed disk controller
178 - 1EF	Unused
1F0 - 1F7	Primary fixed disk controller
1F8 - 200	Unused
201	Joystick (decoded in ESS1688)
202 - 21F	Unused
220 - 22F	Entertainment audio
230 - 26D	Unused
26E - 26	Unused
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	Unused
2A8 - 2E7	Unused
2E8 - 2EF	Reserved serial port

Table 7-7

System I/O Addresses *(Continued)*

I/O Address (hex)	System Function (shipping configuration)
2F0 - 2F7	Unused
2F8 - 2FF	Infrared port
300 - 31F	Unused
320 - 36F	Unused
370 - 377	Secondary diskette drive controller
378 - 37F	Parallel port (LPT1/default)
380 - 387	Unused
388 - 38B	FM synthesizer—OPL3
38C - 3AF	Unused
3B0 - 3BB	VGA
3BC - 3BF	Reserved (parallel port/no EPP support)
3C0 - 3DF	VGA
3E0 - 3E1	PC Card controller in CPU
3E2 - 3E3	Unused
3E8 - 3EF	Internal modem
3F0 - 3F7	"A" diskette controller
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register (PCIDIVO-1)
CFC - CFF	PCI configuration data register (PCIDIVO-1)

Table 7-8

System Memory Map

Size	Memory Address	System Function
640 KB	00000000-0009FFFF	Base memory
128 KB	000A0000-000BFFFF	Video memory
48 KB	000C0000-000CBFFF	Video BIOS
160 KB	000C8000-000E7FFF	Unused
64 KB	000E8000-000FFFFF	System BIOS
15 MB	00100000-00FFFFFF	Extended memory
58 MB	01000000-047FFFFF	Super extended memory
58 MB	04800000-07FFFFFF	Unused
2 MB	08000000-080FFFFF	Video memory (direct access)
4 GB	08200000-FFFEFFFF	Unused
64 KB	FFFF0000-FFFFFFFF	System BIOS

A

Connector Pin Assignments

Table A-1

Audio-Out (Headphone)
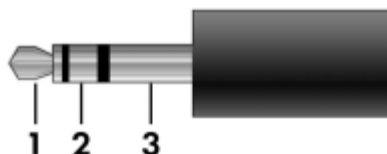
Pin	Signal	Pin	Signal
1	Audio out, left channel	3	Ground
2	Audio out, right channel		

Table A-2

Audio-In (Microphone)
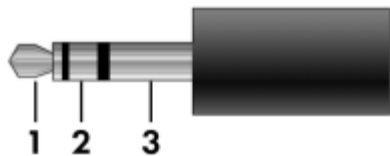
Pin	Signal	Pin	Signal
1	Audio signal in	3	Ground
2	Audio signal in		

Table A-3

Universal Serial Bus
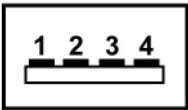
Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data –	4	Ground

Table A-4

External Monitor
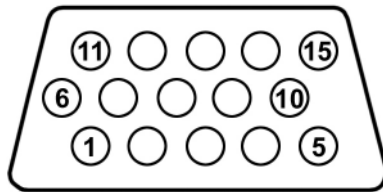
Pin	Signal	Pin	Signal
1	Red analog	9	+5 VDC
2	Green analog	10	Ground
3	Blue analog	11	Monitor detect
4	Not connected	12	DDC 2B data
5	Ground	13	Horizontal sync
6	Ground analog	14	Vertical sync
7	Ground analog	15	DDC 2B clock
8	Ground analog		

Table A-5

RJ-11 (Modem)
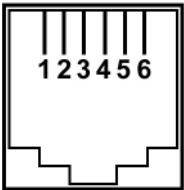
Pin	Signal	Pin	Signal
1	Unused	4	Unused
2	Tip	5	Unused
3	Ring	6	Unused

Table A-6

RJ-45 (Network)
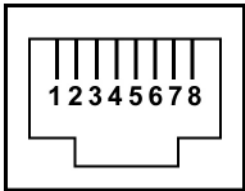
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit –	6	Receive –
3	Receive +	7	Unused
4	Unused	8	Unused

Table A-7

S-Video-Out
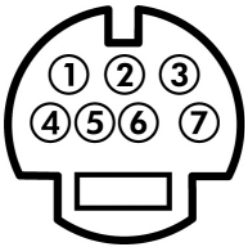
Pin	Signal	Pin	Signal
1	S-VHS color (C) signal	5	TV-CD
2	Composite video signal	6	S-VHS intensity ground
3	S-VHS intensity (Y) signal	7	Composite video ground
4	S-VHS color ground		

B

Power Cord Set Requirements

3-Conductor Power Cord Set

The wide range input feature of the notebook permits it to operate from any line voltage from 100 to 120 or 220 to 240 volts AC.

The power cord set included with the notebook meets the requirements for use in the country where the equipment is purchased.

Power cord sets for use in other countries must meet the requirements of the country where the notebook is used.

General Requirements

The requirements listed below are applicable to all countries.

■ The length of the power cord set must be at least 1.5 m (5.0 ft) and a maximum of 2.0 m (6.5 ft).

■ All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.

■ The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by each country's power system.

■ The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the notebook.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements

Country	Accredited Agency	Applicable Note Number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3

✎ NOTES:

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

3-Conductor Power Cord Set Requirements *(Continued)*

Country	Accredited Agency	Applicable Note Number
The Netherlands	KEMA	1
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1
United Kingdom	BSI	1
United States	UL	2

✎ NOTES:

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

C

Screw Listing

This appendix provides specification and reference information for the screws and screw locks used in the notebook. All screws and screw locks listed in this appendix are available in the Screw Kit, spare part number 383556-001.

Table C-1

Phillips PM2.0×5.0 Screw
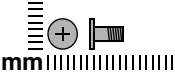
mm	Color	Qty.	Length	Thread	Head Width
	Black	6	5.0 mm	2.0 mm	4.5 mm

Where used:

❶ Two screws that secure the hard drive cover to the notebook (documented in Section 6.5)

❷ Two screws that secure the memory module compartment drive cover to the notebook (documented in Section 6.7)
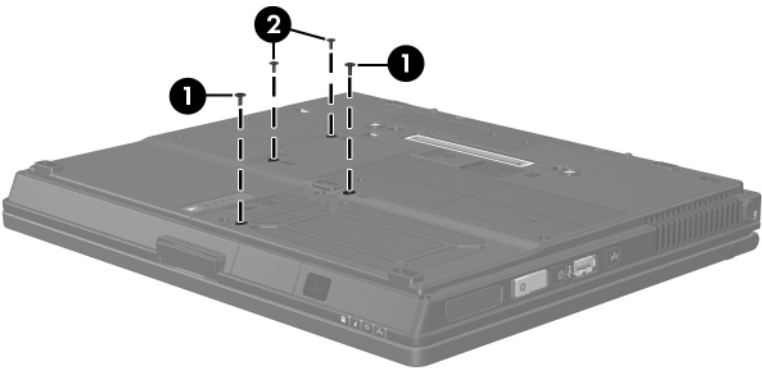

*Phillips M2.0×5.0 Screw Locations*

Table C-1

Phillips PM2.0×5.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	6	5.0 mm	2.0 mm	4.5 mm
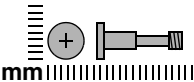
Where used:

2 screws that secure the Bluetooth cover to the notebook (screws are captured on the cover by C clips; documented in Section 6.6)
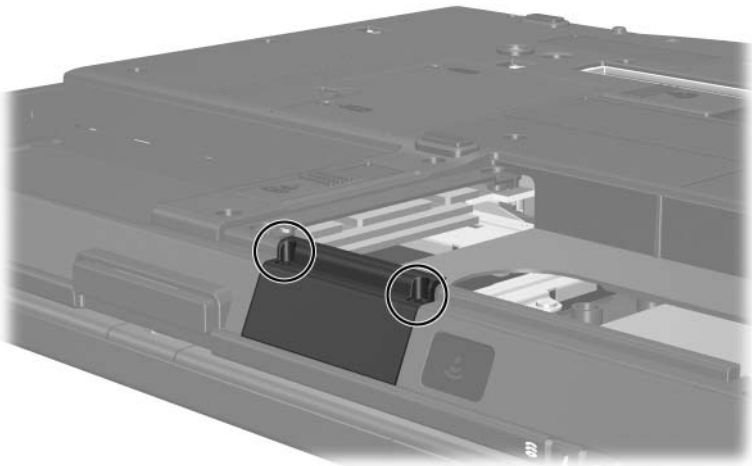
Phillips M2.0×5.0 Screw Locations

Table C-2

Phillips PM2.5×13.0 Spring-Loaded Hard Drive Retention Screw

	Color	Qty.	Length	Thread	Head Width
mm	Black	1	13.0 mm	2.5 mm	5.5 mm

Where used:
❶ One screw that secures the hard drive frame to the hard drive (documented in Section 6.4)

Table C-3

Phillips PM3.0×4.0 Screw

	Color	Qty.	Length	Thread	Head Width
mm	Silver	4	4.0 mm	3.0 mm	5.0 mm
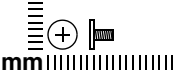
Where used:
❷ Four screws that secure the hard drive frame to the hard drive (documented in Section 6.4)
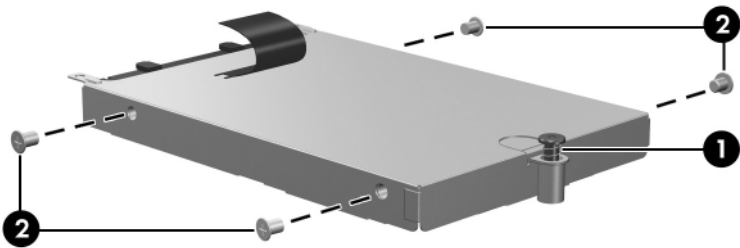
Phillips M2.5×13.0 and Phillips M3.0×4.0 Screw Locations

Table C-4

Phillips PM1.5×3.5 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	1	3.5 mm	1.5 mm	4.5 mm

Where used:

One screw that secures the TPM security card to the notebook (documented in Section 6.8)
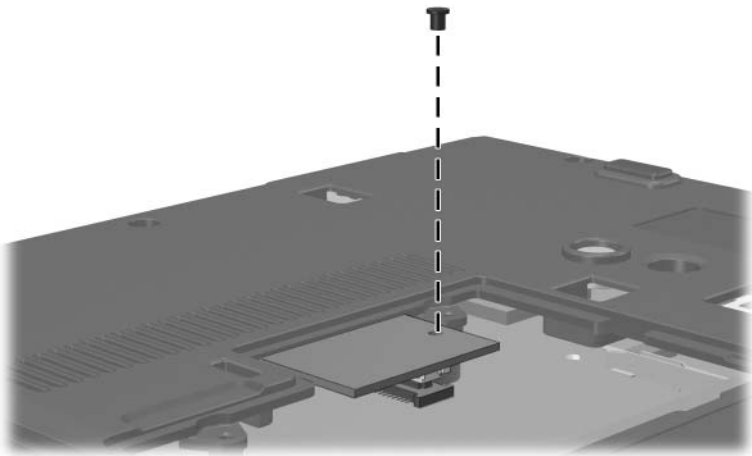
Phillips M1.5×3.5 Screw Location

Table C-5

Torx T8M2.0×18.0 Screw

	Color	Qty.	Length	Thread	Head Width
	Black	8	18.0 mm	2.0 mm	4.5 mm
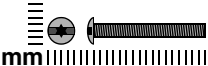
Where used:

2 screws that secure the keyboard cover to the notebook (documented in Section 6.9)
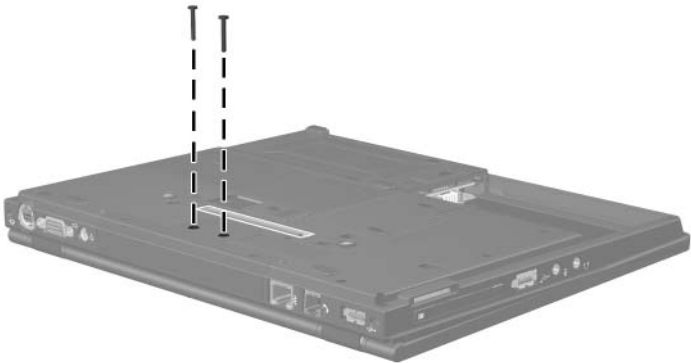
Torx T8M2.0×18.0 Screw Locations
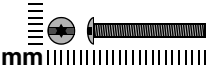
Table C-5

Torx T8M2.0×18.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	8	18.0 mm	2.0 mm	4.5 mm

Where used:

2 screws that secure the base enclosure cover to the notebook (documented in Section 6.16)
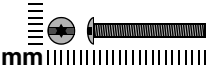
Torx T8M2.0×18.0 Screw Locations

Table C-5

Torx T8M2.0×18.0 Screw *(Continued)*

	Color	Qty.	Length	Thread	Head Width
	Black	8	18.0 mm	2.0 mm	4.5 mm

Where used:

2 screws that secure the display assembly to the notebook (documented in Section 6.16)

Torx T8M2.0×18.0 Screw Locations
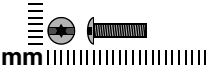
Table C-5

Torx T8M2.0×18.0 Screw *(Continued)*

	Color	Qty.	Length	Thread	Head Width
	Black	8	18.0 mm	2.0 mm	4.5 mm

Where used:

2 screws that secure the rear keyboard cover to the notebook (documented in Section 6.17)

Torx T8M2.0×18.0 Screw Locations

Table C-6

Torx T8M2.0×9.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	12	9.0 mm	2.0 mm	4.5 mm
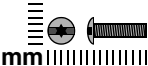
Where used:

❶ Three screws that secure the keyboard to the notebook (documented in Section 6.10)

❷ Two screws that secure the display assembly to the notebook (documented in Section 6.16)
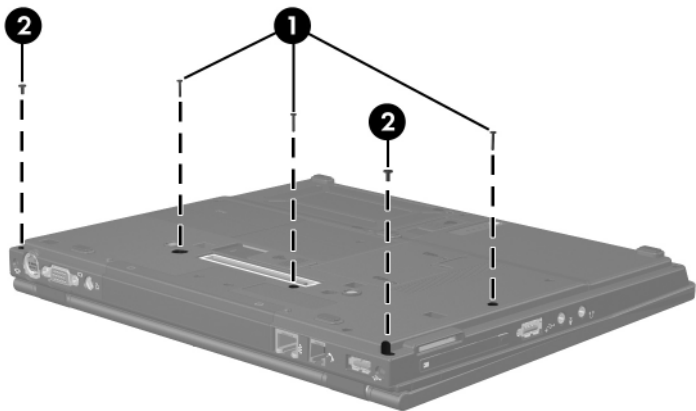
Torx T8M2.0×9.0 Screw Locations

Table C-6

Torx T8M2.0×9.0 Screw *(Continued)*

mm |||||||||||||||||||||	Color	Qty.	Length	Thread	Head Width
	Black	12	9.0 mm	2.0 mm	4.5 mm

Where used:

7 screws that secure the top cover to the notebook (documented in Section 6.18)
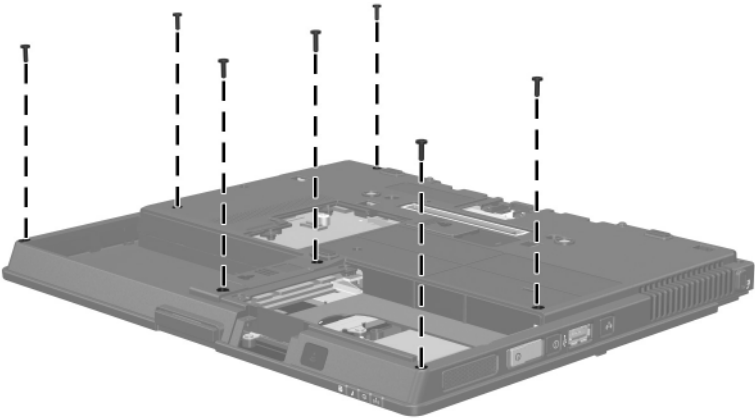
Torx T8M2.0×9.0 Screw Locations

Table C-7

Torx T8M2.0×5.0 Screw

	Color	Qty.	Length	Thread	Head Width
mm	Black	8	5.0 mm	2.0 mm	4.5 mm

Where used:

One screw that secures the keyboard to the notebook (documented in Section 6.10)
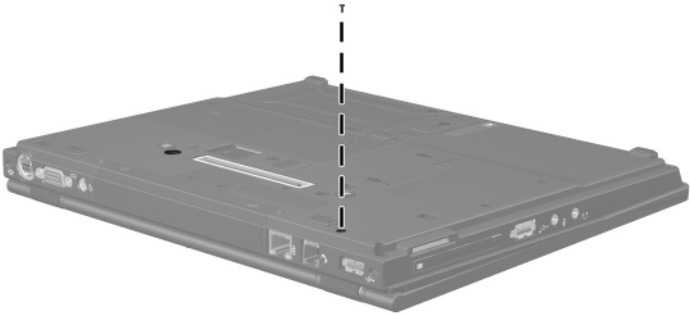
Torx T8M2.0×5.0 Screw Location

Table C-7

Torx T8M2.0×5.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	8	5.0 mm	2.0 mm	4.5 mm

Where used:

❶ Two screws that secure the speaker to the notebook (documented in Section 6.20)

❷ One screw that secures the infrared board to the notebook (documented in Section 6.21)

Torx T8M2.0×5.0 Screw Locations

Table C-7

Torx T8M2.0×5.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	8	5.0 mm	2.0 mm	4.5 mm
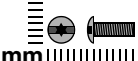
Where used:

4 screws that secure the system board to the notebook (documented in Section 6.22)

Torx T8M2.0×5.0 Screw Locations

Table C-8

Torx T8M2.0×7.5 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	7.5 mm	2.0 mm	4.5 mm
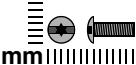
Where used:

3 screws that secure the fan to the notebook (documented in Section 6.11)
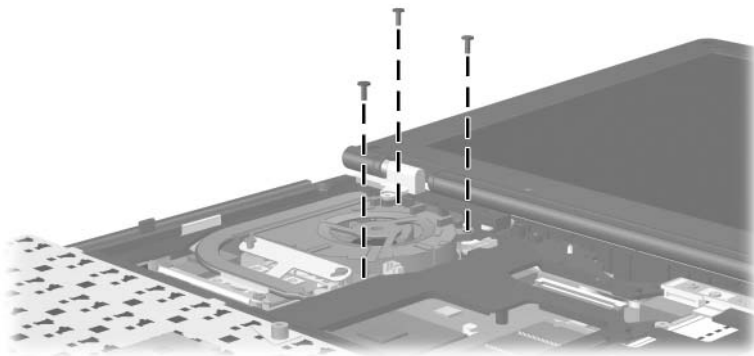
Torx T8M2.0×7.5 Screw Locations

Table C-8

Torx T8M2.0×7.5 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	7.5 mm	2.0 mm	4.5 mm
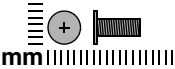
Where used:

One screw that secures the system board and system board spacer to the notebook (documented in Section 6.22)
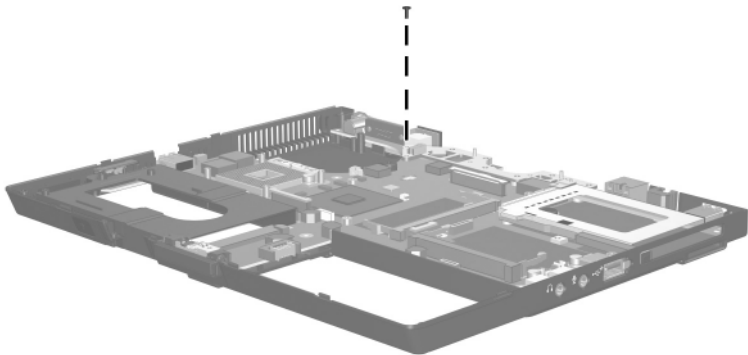
Torx T8M2.0×7.5 Screw Location

Table C-9

Phillips PM2.5×7.0 Screw

	Color	Qty.	Length	Thread	Head Width
	Black	4	7.0 mm	2.5 mm	5.0 mm
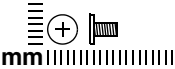
Where used:

4 screws that secure the heat sink to the notebook (documented in Section 6.12)
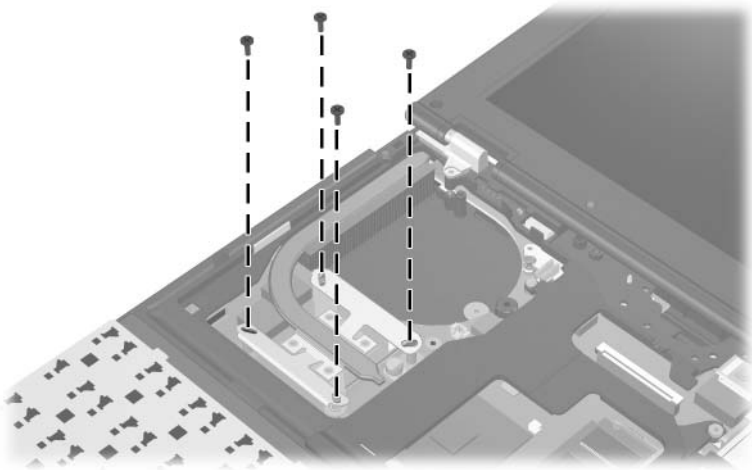
Phillips M2.5×7.0 Screw Locations

Table C-10

Phillips PM2.0×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	8	2.0 mm	4.0 mm	4.0 mm
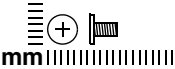
Where used:

❶ One screw that secures the button board to the notebook (documented in Section 6.17)

❷ One screw that secures the top cover to the notebook (documented in Section 6.18)
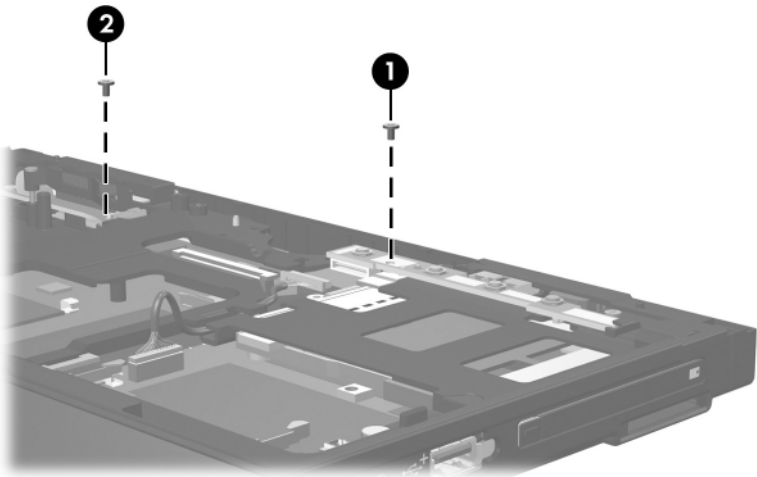
Phillips M2.0×4.0 Screw Locations

Table C-10

Phillips PM2.0×4.0 Screw (*Continued*)

mm	Color	Qty.	Length	Thread	Head Width
	Silver	8	2.0 mm	4.0 mm	4.0 mm

Where used:

4 screws that secure the TouchPad bracket to the top cover (documented in Section 6.19)
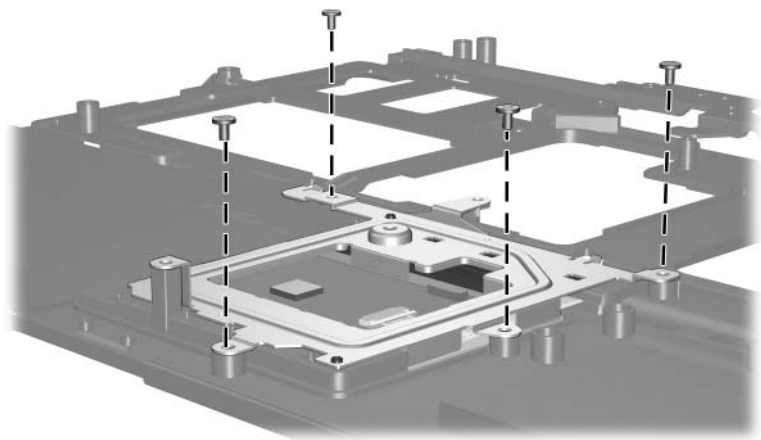
Phillips M2.0×4.0 Screw Locations

Table C-10

Phillips PM2.0×4.0 Screw (*Continued)*

	Color	Qty.	Length	Thread	Head Width
mm	Silver	8	2.0 mm	4.0 mm	4.0 mm

Where used:

2 screws that secure the modem board to the system board (documented in Section 6.23)
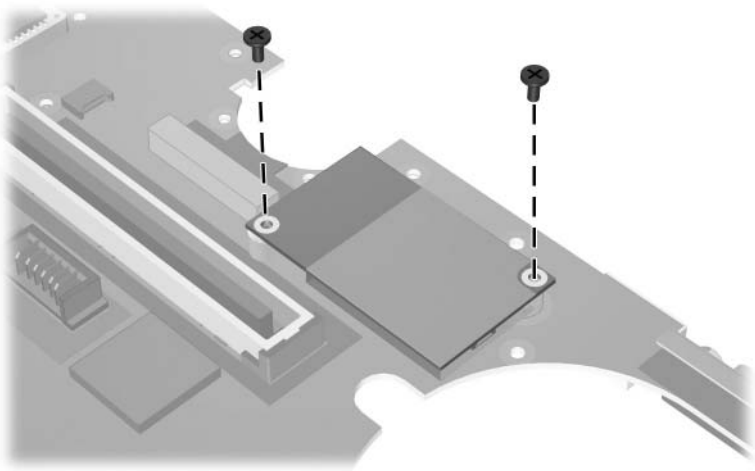
Phillips M2.0×4.0 Screw Locations

Index

A

adjustable notebook stand, spare part number 4–12, 4–15

Advanced Docking Station, HP, spare part number 4–12, 4–15

arrow keys 1–15

audio troubleshooting 2–23

audio-in jack
    location 1–9
    pin assignments A–2

audio-out jack
    location 1–9
    pin assignments A–1

B

base enclosure cover
    location 1–19
    spare part number 4–17

base enclosure, spare part number 4–9, 4–17

battery bay 1–19

battery light 1–7

battery pack
    removal 6–5
    spare part number 4–9, 4–17, 6–4
    specifications 7–5

battery release latch 1–19

Bluetooth cable 4–11

Bluetooth cover
    illustrated 4–10
    removal 6–10

Bluetooth module
    location 1–7
    removal 6–10
    spare part number 4–9, 4–14, 6–10

bottom components 1–18

button board
    removal 6–41
    spare part number 4–5, 4–17, 6–41

C

cables, service considerations 5–2

caps lock key 1–15

components
    bottom 1–18
    front 1–6
    keyboard 1–14
    left-side 1–10, 1–12
    rear 1–10, 1–12
    right-side 1–8
    top 1–16